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PRACTICAL

MIDWIFERY

A
HANDBOOK OF TREATMENT

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BY

EDWARD REYNOLDS, M.D.

Fellow of the American Gynecological Society, of the Obstetric Society of Boston,
etc.; Assistant in Obstetrics in Harvard University; Physician to
Out-Patients of the Boston Lying-in Hospital, etc., etc.

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PREFACE.

WITH all the literary activity which has of late prevailed in obstetrics, it is a curious fact that there has hitherto been no attempt to render the technical details of obstetric practice readily accessible to the student. The necessity of making the general principles of treatment intelligible to the dullest reader, of course, compels the more extended text-books to omit its minor details, and a five-years' experience in the superintendence of the practical work of the advanced students of the Harvard Medical School, in their daily attendance upon by far the largest obstetrical clinic in America, has fully demonstrated to me the importance of this deficiency in our literature. This volume is the result of that experience, and is an attempt to furnish to students and inexperienced practitioners a full description of those practical details of conduct which are necessary to the management of every case of gestation, labor, or the convalescence therefrom. It further aims to supply to such men a concise description of at least one method of dealing with each of the emergencies of obstetrical practice.

If it appears to settle moot points of practice dogmatically, and without privilege of jury, the fault has been intentionally committed, in the belief that a clear description of one justifiable plan of treatment is likely to be of more immediate benefit to an inexperienced practitioner than an extended discussion of the relative advantages and disadvantages of many methods; and because the book is mainly intended for the use of those who have already assimilated the more comprehensive but perhaps less definite information, which it is the province of the systematic text-books to supply.

I have thought it best not to embarrass so elementary and unpretentious a work with a load of bibliography and citations of authority, but I am glad to take the opportunity of acknowledging here my obligations to the works of Lusk, Cazeaux, Schröder, and Galabin; to the authors of Hirst's American System of Obstetrics; and to many others whose past labors have aided me in my own.

My thanks are also due to Drs. R. W. Lovett and C. W. Townsend, for much kind assistance in the revision of the manuscript and its preparation for the press, and to Dr. F. H. Brown for the preparation of the index.

BOSTON, May 20th, 1891.

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PRACTICAL MIDWIFERY.

PART I.—PREGNANCY.

CHAPTER I.

DIAGNOSIS OF PREGNANCY.

THE diagnosis of pregnancy during the earlier months is difficult and sometimes impossible, even when the fullest examination has been allowed, and after all the resources of the specialist have been exhausted; but during the later months it becomes progressively easy, until at term and in uncomplicated cases a mistake is rarely excusable.

The signs from which a diagnosis of pregnancy can be made, may be divided into three classes, those obtained from the history given by the patient, from inspection of the exposed breasts and abdomen, and by the vaginal and bimanual touch.

Such information as can be obtained from history and from ordinary inspection without derangement of the clothing, is attainable in all cases, but is never sufficient for a positive diagnosis, both on account of the inherent weakness of subjective evidence and because the rational signs of pregnancy are so well known to the laity; and, moreover, because the patient so frequently has an object to gain by deception.

Vaginal examination, digital and bimanual, may afford the means of making a positive diagnosis, in exceptional cases, as early as the end of the eighth week; and the proof so obtained usually becomes positive by the end of the third month, at all events if the physician is given the opportunity of making repeated examinations; but the practice of this method of physical examination is rarely to be advised unless the circumstances of the patient render the attainment of an early diagnosis of great social or medico-legal importance.

Examination of the breasts and abdomen occupies a middle position between the other methods, both in value and accessibility. At the latter end of pregnancy, inspection, palpation, and auscultation of the abdomen, in connection with the signs furnished by the breasts, will usually permit of a positive diagnosis, and can then usually be obtained. In the early stages of pregnancy, upon the other hand, this examination is apt to excite nearly as much opposition as the vaginal touch, and is, moreover, at that period, of far from positive value.

The physician's conduct when a diagnosis is asked for, must consequently vary greatly in proportion to the varying social status of the patients, and with the stage to which pregnancy has at that time advanced. When he is consulted early in pregnancy by married women, who, for one reason or another, wish to be assured of the probabilities of their condition, it is seldom or never wise to propose a vaginal examination, and it is usually best to confine one's self to such evidence as can be obtained by questioning the patient. It is then, however, necessary in all cases to give an extremely guarded opinion, since it must be remembered that women who desire children, are peculiarly prone to accept the most cautious statements as fully equivalent to a positive assurance, and that nothing covers a physician with more widespread ridicule, than a supposed inability to diagnose the pregnant condition; which, moreover, offers for his solution a problem which varies from most medical questions, in that the result must always be publicly known. When, however, such patients ask for an opinion at a period when a positive diagnosis can be reached by palpation, *i.e.*, during the sixth and seventh months or later, it is usually easy to obtain the opportunity for such an examination, by reminding the patient of the undoubted fact that it is a distinct advance in her interests if her attendant is permitted to assure himself, not only of the fact of pregnancy, but of the presentation, position, and life of the child at as early a period as possible.

On the other hand, in the case of a patient whose unmarried condition, or other social circumstances render an early decision a matter of prime importance, the only course which is consistent with wisdom, is to firmly decline to express any shade of opinion without a vaginal examination, which under such circumstances will usually be readily granted. It must, however, be remembered that the diagnosis of pregnancy is always dependent upon the coincident appearance of all the symptoms of the condition, rather than upon any one pathognomonic sign, and to attain a knowledge of the relative value which these signs and symptoms possess, it is necessary to study them in detail.

History and Inspection.

Amenorrhœa.—The absence of the accustomed catamenial period is usually the first sign which attracts the attention of the patient to a suspicion of her condition. Its value is impaired by the fact that it is not uniformly present; cases being occasionally observed in which apparently normal menstruation occurs throughout the whole or greater part of pregnancy, but the utmost scepticism is always the best rule of conduct in these cases, which are often of pathological origin, while on the other hand, actual amenorrhœa may be due to a variety of other causes. The fact remains, however, that where the patient has been exposed to conception and was previously regular in her menstrual habits, the non-appearance of two or more successive catamenia is always strong presumptive evidence of pregnancy.

The more usual causes of amenorrhœa when not dependent on pregnancy are chlorosis; and anæmia, whether this be simple, or due to the presence of chronic wasting disease such as cirrhosis, phthisis, Bright's disease, etc.

In women who are still nursing, or are habitually irregular, the evidence furnished by this sign is, of course, of little or no value. The non-appearance of one or more catamenial periods may also be due to any unusual fatigue or excitement, such as grief, overwork, or the onset of insanity; it is not infrequent among newly married women, as a result of a pelvic excitement caused by the recently adopted marital relation; and in unmarried woman who have imprudently exposed themselves, is often referable to an excessive fear of pregnancy.

Nausea and Vomiting.—An almost equally prominent symptom of pregnancy, and one equally well known to the laity, is the digestive disturbances of the first four months, which usually appear in the form of nausea and vomiting, limited especially to the early hours of the day. This symptom, is however, by no means constant, so that its absence possesses but slight negative importance; but its presence in connection with amenorrhœa, is, if chlorosis, severe anæmia, and Bright's disease can be excluded, strongly suggestive of pregnancy.

Salivation.—The excessive salivation which is sometimes noticed is rather less constantly present than nausea and vomiting. Its absence is of even less importance; its appearance has about the same significance.

Breasts.—A sensation of weight and fulness in the breasts, and perhaps the appearance to the eye of an increase in their size, are more or less constant accompaniments of pregnancy, the change being commonly better marked in primiparæ than in multiparæ. The latter patients not infrequently dream, during the early months of pregnancy, that they are nursing a baby.

QUICKENING.—The perception of the fœtal movements by the mother is commonly termed quickening. If actually present it is of course diagnostic, but this is a point upon which women are prone to deceive themselves, and its presence as a subjective symptom consequently possesses but little value; indeed, it has been well said, that probably no woman ever imagined herself pregnant without feeling distinct fœtal movements. It may be perceived, especially by women of a sensitive organization, as early as the middle of pregnancy, and sometimes in the course of the fourth month.

LEUCORRHŒA.—A marked increase in the vaginal secretions is an almost constant accompaniment of pregnancy, but may be due to many other conditions and possesses little or no diagnostic value.

SENSATIONS DURING COITUS.—Certain women believe themselves able to distinguish a fruitful from an unfruitful coitus, by their perception during the connection which they believe to have been eventful, of certain peculiar, voluptuous, or other sensations which they have never felt at any different time. The value to be placed upon such statements must always depend upon the physician's estimation of the particular patient's powers of observation.

GAIT.—If the patient be made to take a few steps under the eye of the physician, close observation of her gait may sometimes furnish evidence of value. Pregnant women are prone to assume a backward pose, and a certain carefulness of step, from a very early period of gestation.

ALTERATION OF FIGURE.—Where the physician has been previously familiar with his patient he may sometimes be able to observe at an early period a characteristic change of figure, which is often of considerable diagnostic importance during the later months. This consists in an enlargement of the breasts, and in an increased antero-posterior prominence of the abdomen with but little corresponding increase in the lateral diameter.

In estimating the value to be derived from observation of the above list of symptoms, it should never be forgotten that they are all so well known to the laity that many patients are able to construct a history which is most ingeniously calculated to deceive the physician; that their value as evidence is only cumulative, becoming more and more marked in proportion as a larger and larger number of symptoms are present; and that in early pregnancy a diagnosis should never be made from this class of symptoms alone.

EXAMINATION OF THE ABDOMEN AND BREASTS.

BREASTS.—The changes in the breasts due to a previous pregnancy are never entirely effaced, and their examination is, therefore, ordinarily of much greater value in primiparæ than in those who have already borne children. The breasts of a virgin contain little, if any, glandular tissue which is perceptible to the touch. The nipples are small, and the skin of the nipples and areolæ is of a delicate pink color; the areolar papillæ are not ordinarily noticeable.

With the adoption of an active sexual life, the nipples become more prominent, the areolæ begin to show a brown pigmentation, the areolar papillæ become evident; and with the supervention of pregnancy, all these changes become much more marked, so that within the first few months, the prominence of the papillæ, the distinctive brown discoloration of the areolæ and nipples, and the presence to the touch of distinctly glandular tissue are easily distinguished. A few drops of milk may often be expressed from the nipple during pregnancy, but the presence of milk in the breast is not absolutely conclusive, as it may sometimes, though rarely, be found during puberty and the menopause, exceptionally at the catamenial periods, and occasionally in the presence of uterine or ovarian neoplasms.

ABDOMEN.

INSPECTION.—A certain brown pigmentation of the linea alba is commonly observed in pregnancy, especially in brunettes, but may occur in so many other conditions as to be of little differential value. An increase in the antero-posterior diameter should be perceptible in spare subjects at about the end of the fourth month, the comparatively slight increase from side to side, being an important point in the diagnosis, since most other enlargements of the abdomen result in a symmetrical increase; a statement which is especially true of the distention from tympanites, which is so frequently seen in women, and against which the physician should be constantly on his guard when consulted upon this subject, by women whose fears or desires have impressed them with the belief that they are not improbably with child.

PALPATION.—Deep palpation in the pubic regions will often enable the observer to recognize in the median line the fundus of the uterus, and to distinguish it by its shape, consistency, and median position from ovarian tumors, and other abdominal neoplasms, since at the end of the eighteenth week the uterus is usually sufficiently enlarged to permit recognition of the fundus by abdominal palpation above the symphysis pubis. In advanced pregnancy abdominal palpation may be entirely sufficient for the establishment of a positive diagnosis by recognition of the characteristic shape of the fœtus.

It is always necessary to the proper performance of this examiation that the clothing of the patient should be so far loosened or removed that the whole abdomen is exposed, or at most covered by a single thickness of cloth. The patient should lie upon her back and with the knees slightly drawn up, so that the abdominal walls may be relaxed to the utmost degree possible; the physician should stand by her side, facing toward the feet, and with a gentle, steady motion should press the ulnar borders of the hands deeply into the abdomen upon each side of the uterus, until the body of the organ is made to rest between the hands. One hand is then held immovable while the other makes intermittent pressure against the tumor, in the effort to distinguish its contour and consistence. The pregnant uterus yields to the examining hands a sense of elasticity which closely approaches an obscure fluctuation, and which is as much separated on the one hand from the extreme hardness of a fibro-myoma, as its partly solid contents are, upon the other hand, from the uniform resistance of an ovarian cyst. If the pregnancy has advanced beyond the sixth month, recognition of the various fœtal members can usually be attained, though with less distinctness than in palpation when performed at term. Should the body in question alter its shape and consistency while under examination, from an oblong, soft, or elastic mass to a more or less firmly resistant organ, it may be taken for granted that the alteration in question is a contraction of the pregnant uterus, this being one of the most valuable of all the signs which can be gained by abdominal palpation.

DETECTION OF THE FŒTAL MOVEMENTS.—During the latter part of pregnancy, the examining hand often detects the movements of the fœtal limbs; but this sign, though valuable, is not certain, as it may be very exactly simulated by irregular and localized spasmodic contractions of the abdominal muscles, especially in hysterical women, and in those who suspect themselves to be with child, and long for confirmation of their hopes. It may also be imitated by an irregular uterine contraction—a phenomenon which is more likely to occur in cases where the contents of the uterus are pathological, as, for instance, in hydatidiform mole.

AUSCULTATION.—This method of examination furnishes us with two points for observation; the so-called placental or uterine souffle, and the sounds of the fœtal heart.

The uterine souffle is an intermittent sound, exactly synchronous with the mother's pulse, which is probably due to the increased circulation in the uterine arteries, and was formerly thought to be pathognomonic of pregnancy, but is now known to occur in many other enlargements of the uterus. Its absence is suspicious, in alleged pregnancy, after the fourth or fifth month; its presence is suggestive, but nothing more.

The detection of the fœtal heart, beating at a speed in no way allied to the rate of the maternal pulse, is, if observed by the experienced ear, one of the two distinctive signs of pregnancy, since it can exist in no other condition. It has been heard at the end of the fourth month of utero-gestation, but is not commonly perceptible before the middle or end of the sixth. It is classically described as resembling the ticking of a watch when concealed beneath heavy bed-clothes, and when once heard is thereafter usually recognized, but except in a few instances, where the double heart sound is clearly perceptible, is not easily described for the benefit of those who are unfamiliar with it.

It may sometimes be heard with much distinctness over the greater part of the whole abdomen, or may again be limited to a single spot of small extent. It is usually heard over the back of the fœtus, and in head presentations slightly below the umbilicus; and since left positions are decidedly the more frequent, its most common site is along the line from the umbilicus to the left anterior superior iliac spine. It should be listened for at first in the neighborhood of this line, but if it is not heard here, the line of search should be made to sweep gradually around the abdomen into the right flank, covering, so far as possible, every inch of the surface. Its absence cannot, however, be fully demonstrated by a failure to hear it at any single examination, since the position of the child not infrequently so alters the transmission of its heart sounds as to make them inaudible at one time and particularly distinct at another. Its recognition can never be positively decided upon unless the observer is able to determine its frequency by count, and thus differentiate it from transmitted sounds due to the maternal pulse.

The fœtal heart may frequently be heard with the naked ear applied directly to the abdomen, but is more easily found by the aid of a binaural stethoscope, which should be furnished with a wide mouth. In the use of the instrument for this purpose, a point of much practical importance is the fact that the application of the fingers to the stethoscope is often sufficient to divert the transmission of such feeble sounds as the fœtal heart, and thus render them inaudible; for which reason the mouth of the stethoscope should be moistened to prevent its slipping upon the abdominal walls, and the instrument should be steadied by the motions of the head, without the aid of the hands.

The recognition of the fœtal heart during early pregnancy by vaginal auscultation has been suggested but is seldom practised.

VAGINAL AND BIMANUAL EXAMINATION.

INSPECTION.—By inspection of the vaginal orifice we are enabled to note two things; firstly: the shape and condition of the hymen, if present; secondly: the coloration of the vagina.

In women who have had intercourse the hymen is commonly lacerated, but a crescentic or even an annular hymen may be so distensible as to permit the passage of a full-sized male organ without visible laceration, and the existence of a non-distensible hymen with a small orifice is not of necessity absolutely exclusive of pregnancy, as numerous cases of impregnation without penetration have been reported. The existence of such a state of affairs would, however, of course, render pregnancy extremely improbable, and if, in such cases, any further examination seems necessary, it should be strictly limited to the bimanual rectal touch, at least until the existence of pregnancy has been demonstrated beyond a doubt.

A blue discoloration of the vestibule and of the anterior portion of the vaginal wall has been described as present in the majority of cases after the middle or end of the third month, and as absolutely diagnostic of pregnancy and likely to occur in no other condition. It is certainly frequently present, but the majority of authorities are now agreed that it not infrequently fails to appear until late in pregnancy, and that it moreover has been found in other and pathological conditions. Its value is then that of suggestion, rather than of evidence.

DIGITAL EXAMINATION.—The vagina of pregnancy is somewhat relaxed, moist, and softened from an early period, but these changes are rarely sufficiently pronounced to furnish evidence of real value. The alterations of the cervix and of the uterine body, however, often supply evidence of the first importance.

The index finger, or if the size of the introitus permits, the first two fingers, should be thoroughly greased with vaselin or some other lubricant, and gently passed within the vagina to their full length. They should note in entering, the size and direction of the orifice, the firmness of the external parts, the condition of the rectum, whether empty or filled with fæces, the length and width of the vagina, and the amount of its secretion. The palm of the hand should at first be turned upward with the external fingers extended across the mons veneris to enable the observer to explore thoroughly the anterior part of the pelvis. The palm should next be turned downward, by rotation of the wrist upon the forearm, and the external fingers allowed to lie between the nates, when by gentle pressure upward and backward, the perinæum may be sufficiently retracted to enable the physician to note the width and shape of the sacrum, and in contracted pelves may permit him to reach the promontory. The finger tips should then be made to pass slowly forward, until they meet the cervix, which is not infrequently found high up and well toward the rear of the pelvis. The shape and patency of the external os should now be noted, and the consistency and length of the vaginal portion of the cervix, which during advanced pregnancy becomes distinctly softened and shortened. Its condition, however, always depends largely upon the existence or non-existence of previous pregnancies. The cervix of a primipara preserves its more or less conical shape, and the os is normally small and rounded, but the cervix as a whole is of a softer consistency than in the non-pregnant state. The os is seldom or never patulous, and the cavity of the cervix is usually occupied by a more or less abundant mass of thick stringy mucus. Among multiparæ, on the other hand, the external os is usually freely patulous during pregnancy, the finger penetrating in most cases into the cervix and nearly to the internal os, and in some cases finding that also sufficiently open to permit the finger to come in contact with the membranes, or to detect the fœtal head; which latter condition is, however, rare in any but advanced pregnancy.

By the vaginal touch we are also able to obtain that most valuable of all evidence, the sign known as ballottement. This is obtained by placing the pulp of the finger in contact with the body of the uterus and vertically below it, then imparting to it a sharp upward movement and afterward holding it immovably fixed in position. If the uterus be pregnant, the contained fœtus, being a little heavier than the amniotic fluid which surrounds it, is urged upward by the impulse of the finger, and in settling down to a dependent position a few seconds later, gives to the finger a distinct tap which cannot be simulated under ordinary circumstances by any other condition.[1]

Ballottement is best obtained by examination while the patient is standing, and its absence can never be considered established until after an examination in that position; it can then occasionally be obtained as early as the end of the third month, and usually by the end of the fourth.

Bimanual Touch.—The combination of the vaginal touch with the assistance furnished by pressure from the other hand, constitutes the method commonly known as the bimanual. By this examination we are enabled to appreciate any alteration in the shape or size of the uterus.

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[1] A slightly enlarged and prolapsed ovary, or a small pedunculated, subperitoneal fibroid may furnish a false ballottement; but the existence of these pathological conditions, and their extra-uterine situation, should always be detected by the bimanual touch.

An increase of the body of the uterus in all diameters, antero-posterior as well as lateral, unaccompanied by any corresponding increase in the size of the cervix, and combined with the characteristically soft and "boggy" feeling of the latter, may sometimes be perceived at the end of eight, or even six weeks of utero-gestation, and though not sufficiently marked at that period to be conclusive, is, when taken in connection with the existence of rational signs, very strong evidence of the existence of pregnancy. If circumstances permit the observer to watch the gradual increase in size of the uterus from week to week, and month to month, it is often possible to make a fairly positive diagnosis at a comparatively early period.

The alteration in the shape of the uterus known as Hegar's sign is not difficult of perception, and is of great value. Hegar describes it as an enlargement of the body of the uterus in such a way that this overhangs the cervix, especially in front, as a distinct ridge marking the junction of the body and cervix; accompanied by a distinctly boggy sensation in the lower uterine segment. This alteration should always be sought for, and if found is one of the most important signs obtainable.

ETHER.—In cases in which the diagnosis is rendered obscure by rigidity, or great thickness, of the abdominal walls, or by involuntary resistance on the part of the patient, the administration of an anæsthetic will sometimes smooth away all obstacles, and in cases in which the question assumes much medico-legal or other importance this resource should always be called to our aid before a positive opinion is declared.

Diagnosis of the Stage of Pregnancy in Months.

This can never be more than fairly approximate, and must depend mainly on an estimation of the size of the uterus and child by external palpation, or in the early months by bimanual examination, this sign being taken in connection with such evidence as can be gathered from the history.

In the course of the fourth lunar month the fundus of the uterus rises above the symphysis pubis, and in the fifth month it is half way between the symphysis and the umbilicus, which latter point is reached about the end of the sixth. In the eighth month it is nearly half way between the navel and the ensiform cartilage, at the end of the ninth month almost at the cartilage, and in the latter half of the tenth month, commonly sinks forward and downward, until it reaches a point not far distant from that at which it was found at the end of the eighth; this subsidence is due to the passage of the head from the abdomen into the pelvis, and is generally much more marked in first than in subsequent pregnancies, in which latter the head seldom enters the pelvis until after the beginning of labor.

During the later months an experienced observer can frequently obtain considerable information by bimanual estimation of the size of the child.

Diagnosis of the Previous Existence of Pregnancy.

The physician is sometimes called upon to answer the question as to whether or no a given woman has ever borne a child. The question when it arises is usually of medico-legal importance, and is one which should be answered only after the most careful scrutiny. Its decision must rest upon the evidence furnished by inspection of the genital canal, by the bimanual touch, and by examination of the breasts and abdomen.

The changes in the nipples and areolæ which have been previously described as characteristic of pregnancy should first be looked for. The existence of fine radiating cutaneous scars, due to previous distention of the breasts, if present, furnishes distinctive evidence. Scars due to the opening of previous mammary abscesses possess the same significance, in the absence of any other reason for their presence. Similar cicatrices in the skin of the abdomen should always be looked for, and in parous women are almost invariably found, at least if the previous pregnancy has advanced as far as the end of the seventh month.

EXAMINATION PER VAGINAM.—If the woman has ever borne a child, a vaginal examination should establish the non-existence of the hymen as such, and the presence of the carunculæ myrtiformes; more or less relaxation and distention of the whole of the vaginal canal; the increased size and altered shape of the uterus due to a previous parous condition; the possible scar of a previous laceration of the perinæum, and lastly, the existence to a greater or less degree of laceration of the cervix—an accident which is avoided by an extremely small proportion of parous women; indeed the passage of an ovum no more developed than is usual at the third month, frequently leaves a distinctly perceptible laceration of the edge of the external os.

It is, however, necessary to avoid confounding this last condition with the eversion of the margin of the os, which is sometimes seen in virgins who have been the subjects of chronic endocervical catarrh; and it is always well before expressing an opinion of medico-legal importance, to exclude the possibility that a slight laceration may have been caused either by previous treatment of a cervical stenosis or pinhole os, or by the extraction of a uterine polypus or other tumor from a non-pregnant uterus.

Differential Diagnosis of Pregnancy.

The differentiation of the pregnant uterus from other abdominal tumors can only be made by physical examination, and may occasionally present considerable difficulty. The establishment of pregnancy depends upon the decision that the enlargement of the abdomen is due to an enlargement of the uterus, and then that this is due to pregnancy and to no other cause.

The only tumors whose existence is likely to lead to mistakes are ovarian cysts, fibro-myomata of the uterus, and the enlarged tube of an extra-uterine pregnancy.[1]

OVARIAN TUMORS.—An early pregnancy is to be differentiated from a small ovarian cyst only by the bimanual touch, and then frequently requires the administration of an anæsthetic. The diagnosis is to be made by the establishment of the extra-uterine situation of the tumor, and by a demonstration of the unenlarged uterus at its side. In addition, though the consistency of an ovarian cyst varies greatly with the degree of its distention, it is always different from that of the unimpregnated uterus.

An ovarian cyst of large size may be distinguished from an advanced pregnancy by the fact that ovarian new growths present far less defined outlines than the pregnant uterus, and seldom occupy the median line; that they ordinarily yield distinct fluctuation, that no fœtal parts can be found by palpation, and no fœtal heart heard on auscultation of the tumor. Not infrequently, and especially if the patient is examined in the upright position, the outlines of the non-pregnant uterus can be perceived by the examining finger below the tumor, though usually in some abnormal position.

In case of doubt, the two conditions may be differentiated by the difference in the rate of growth, and by the non-appearance of labor at the time when it would have been expected.

FIBRO-MYOMATA.—Slight enlargements of the non-pregnant uterus from the presence of interstitial fibroids, may sometimes give rise to the suspicion of early pregnancy; the distinctive points are, however, the greater hardness of the uterus when the enlargement is due to the presence of myomata, the absence of Hegar's sign, the fact that such a uterus is almost always asymmetrical, and that the tumors are seldom single and therefore usually present a more or less lobulated outline.

Large fibroids may usually be distinguished from advanced pregnancy with the greatest ease by their hardness and irregular shape, but the complication of previously existent fibroids by pregnancy may be extremely difficult of recognition.

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[1] For the differential diagnosis of extra-uterine pregnancy, see page 32.

Pregnancy Complicated by Abdominal Tumors.

When pregnancy is complicated by a co-existent and previously unsuspected abdominal tumor, the recognition of the latter before delivery is only possible when it is rendered accessible by being crowded into prominence below the increasing uterine tumor, or when it can be felt as an accessory enlargement in one or the other flank. When such a tumor is already known to exist, any sudden and rapid increase in the size of the abdomen should always suggest the possibility of its complication by an intercurrent pregnancy, and should lead to a careful attempt at abdominal palpation of the uterine body.

When pregnancy occurs in a uterus already the seat of fibroids, the tumors usually grow with extreme rapidity, but no positive recognition of the complication can be secured until the fœtal heart sounds become audible or ballottement can be obtained.

CHAPTER II.

CALCULATION OF THE DURATION OF PREGNANCY, AND THE DEVELOPMENT OF THE FŒTUS IN THE SUCCESSIVE CALENDAR MONTHS OF PREGNANCY.

THE first essential for the determination of the duration of pregnancy is our ability to fix the date of its beginning, but the circumstances of the case are such as to make this practically impossible in the great majority of cases, and, indeed, even if, in a given case, it can be safely estimated that the pregnancy has originated from a single coitus of known date, the time of the occurrence of impregnation may probably vary within somewhat wide limits. It has been found by observation that the pregnancies of animals, in which the date of coitus can be accurately known, vary in duration by an average of about twenty per cent of their total length.

For these reasons it is usual to calculate the duration of pregnancy by taking the date of the last menstruation previous to pregnancy as that from which to start the computation. Statistics taken from a large number of cases show that eighty per cent of all women are delivered at a date within one week of two hundred and eighty days from the close of the last menstruation; the exact day of parturition being probably decided by numerous small, accidental, mental or physical causes. But as most women are more exact in their account of the day on which menstruation begins, it is customary to estimate the duration of pregnancy by the addition of two hundred and eighty-five days to the date at which the last menstruation began.

It was formerly thought that conception could be avoided, in almost all cases, by abstinence from coitus during the first few days after and before menstruation, but recent observations tend to show that ovulation may be and probably usually is, entirely independent of menstruation, and that impregnation may consequently occur in any part of the menstrual month.

A very strong argument in support of this view may be drawn from clinical observation of the fecundity of the Jewish race; it being well known that Jewesses almost invariably observe to this day the directions of the Mosaic law which forbade connection until after the bath of purification, a ceremony which is observed upon the seventh day after the cessation of the menstrual flow. Menstruation is, moreover, fixed by the Mosaic law as lasting at least five days; so that Jewish women are restrained from connection during at least twelve days of the twenty-eight, and in cases of profuse menstruation, of course possibly much longer; notwithstanding which fact the fertility of the race is a matter of proverbial knowledge.

The possibility that conception may not have occurred until just before the period which was expected but failed to appear, explains readily the frequent occurrence of cases in which delivery is delayed until about three weeks after the date at which it was expected; instances which are so frequent that it is a matter of practical observation that if a woman passes her time by one week the probable date of delivery should be set at about a fortnight later.

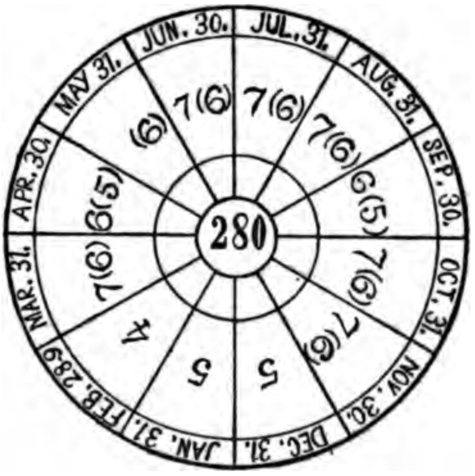

FIG. 1.—DIAGRAM OF SCHULTZ.

The two hundred and eighty days which are considered to be the average duration of pregnancy correspond to ten lunar months, and in most women to ten menstrual periods, a time which approaches so closely to nine calendar months that the rule originated by Naegele, to count forward nine months, or what amounts to the same thing, backward three months from the date at which the last menstruation began, and add to that date five days for the probable duration of the catamenia, has become the usual method of calculation. This method is exact for seven months in the year, but owing to the irregularities in the length of the calendar months, is not as exact for the remainder. It is, therefore, usually a convenience to consult the well-known figure of Schultz, which, or its equivalent, is included in most physician's visiting lists.

An approximate check upon this reckoning may be effected by observing the date of quickening, which is most often noticed at the end of about twenty-two weeks. The perceptive powers of different women vary so greatly, however, that this furnishes us, at the best, with a very loose method of reckoning.

Some confirmatory evidence can be obtained by observing the size of the uterus, but the whole matter is unfortunately one in which great accuracy is absolutely unattainable, and which is one of the constant *bêtes noirs* of every practising physician. It will, however, conduce greatly to the comfort of the physician to make the best calculation possible himself, rather than to accept the date which the woman or her friends have previously fixed upon.

Prolonged Pregnancy.

The possibility of an abnormally prolonged pregnancy is a question which is frequently raised in medical practice, and which sometimes becomes of medico-legal importance. The weight of authority tends strongly to discredit the possibility of the extension of the period of pregnancy to a length greater than three hundred days, and it is highly probable that even this limit is a somewhat large estimate of the true duration of pregnancy. This statement must, however, be qualified by an acceptance of the possibility that conception may have occurred twenty or more days after the date commonly taken as the beginning of pregnancy, *i.e.*, the occurrence of the last menstruation, and it is, moreover, possible that we may be further misled by the existence of an irregularity in the length of the intermenstrual period immediately before the occurrence of conception. Even the few well-observed cases of prolonged pregnancy are probably due to such causes, and the physician who preserves an attitude of scepticism toward such reports will rarely be mistaken. The nearest approach to credibility belongs to cases where an amenorrhœa of unusual duration is followed by the birth of an unusually large and very fully developed child.

Development of the Fœtus in the Successive Calendar Months of Pregnancy.

As it is often necessary for the obstetrician to judge of the duration of pregnancy by the appearance of a recently expelled fœtus, it is well to bear in mind the main points which form the basis of such an opinion.

FIRST MONTH.—So few specimens of the human ovum, expelled during the first two months of pregnancy, have been thoroughly studied and the variations in those were so great, that the examination of an ovum of less than two months' development, is rather a matter of importance to the embryologist than of practical value to the accoucheur.

SECOND MONTH.—By the end of the second month the ovum is of the size of a hen's egg; the embryo measures from two-thirds of an inch to an inch in length; the chorionic villi are more abundant in the neighborhood of the umbilical cord; ossification begins in the lower jaw and clavicle, and the three divisions of each extremity are clearly indicated.

THIRD MONTH.—At the end of the third month the embryo is from three to three and a half inches in length and weighs about an ounce; the chorionic villi have mostly disappeared and the placenta is small but well developed; the neck is now differentiated and the ribs are visible; spiral turns appear in the cord; the mouth is closed by the lips, points of ossification appear in most of the bones; and the first indication of nails appears; the sex is indistinguishable.

FOURTH MONTH.—At four months, the fœtus measures from four to six inches in length, its weight being from three to four ounces; the mouth, eyes, ears, and nose begin to assume their proper shape; the sex is distinguishable, hair begins to form upon the scalp, and the fœtus makes slight movements with its limbs.

FIFTH MONTH.—At the end of this month, the fœtus is about ten inches long, and weighs in the neighborhood of twenty ounces; the eyelids separate, fine lanugo appears over the whole surface of the body, and the movements are more distinct.

SIXTH MONTH.—The fœtus measures from fourteen to fifteen inches, and weighs from thirty-five to forty ounces; the skin is still red and wrinkled, but is covered with vernix caseosa; the child moves its limbs, and may cry feebly at birth, but seldom or never survives. It is, however, right that every child which breathes and cries should be treated as though its life might possibly be preserved.

SEVENTH MONTH.—At the end of this month, the fœtus measures sixteen to seventeen inches and its weight averages about fifty ounces, though in this, great variation is the rule; the pupil lary membrane is gone from the eyes, and the hair on the head is well developed; the lanugo has disappeared from the face, and the nails are well formed, but do not yet reach the tips of the fingers; in boys, at least one testicle is usually found in the scrotum. Many such children survive with proper care.

EIGHTH MONTH.—At the end of the eighth month the nails have reached the ends of the fingers, the body is rounded, and the face has lost its senile aspect. Eight-months children can be distinguished from those born at full term, only by their small size and lethargy. The greatest care is required to preserve their vitality

CHAPTER III.

THE FUNCTIONAL DISORDERS OF PREGNANCY, AND THE MANAGEMENT OF NORMAL PREGNANCY.

THE state of pregnancy occupies an intermediate position between the conditions of chronic disease and those of ordinary health. The whole physiology of the pregnant woman is being subjected to a series of changes, that produces, in the majority of cases, a symptomatology which differs from that of disease in degree rather than in kind; so that a normal pregnancy may be defined as one in which the disorders of the various organic systems do not exceed normal limits.

Hygiene and Care of Normal Pregnancy.

In the management of normal pregnancy the physician should aim to limit his attentions to the proper regulation of the habits and general hygiene of his patient, and should encourage her to endure the discomforts of her condition so long as they remain within the limits of health, avoiding all unnecessarily active treatment; but since this line of action implies, of necessity, an accurate knowledge of the various disturbances incidental to pregnancy, it is impossible, in describing its management, to wholly separate the normal and abnormal; for which reason it is convenient to open the subject by a description of the general hygienic precautions which should be adopted, and afterward to take up in detail the disorders of the various organic systems, defining the normal limit, so far as possible, under each heading.

HYGIENE OF PREGNANCY.—If a pregnant woman is to remain well nourished, the extra energy necessarily expended in the formation of the tissues of the embryo must, of course, be provided for by an increased absorption of nutritious material. In some women the increased demand is supplied by a quickened activity of the processes of assimilation, but in most cases the requirement is met by an increased ingestion of food, *i.e.*, an improved appetite, which is most marked during the later months, when the growth of the child is most rapid; and since the diminished abdominal space proper to this period makes the ingestion of unusually full meals uncomfortable and even pernicious, it is a general rule that pregnant women should be advised to satisfy their increased appetites by partaking of food at shorter intervals than usual, rather than by taking an increased quantity at each meal. They may, with advantage, be urged to take up the habit of drinking a glass of milk or taking a cup of coffee before rising, and should be instructed to take light lunches in the middle of the morning and afternoon, in addition to the regular meals; many women also find that their sleep is improved, and that faintness in the morning is decreased by a light supper in the evening; and some such habits of life should always be recommended. No restriction of diet is necessary, other than to advise a preponderance of simply cooked, easily digested, nutritious materials.

Constipation is especially to be avoided, and should be combated by regulation of the food and, if necessary, by the use of cathartics. Frequent bathing of the whole skin is particularly to be enjoined. The increased metabolism of pregnancy involves an increased activity of the excretory organs; and nothing is more certain to encourage disturbances of the kidneys than the increased work thrown upon these organs by the inactivity of the skin, which is itself due to an imperfect removal of the worn-out epidermis, and a consequent clogging of the excretory ducts by their own secretions. The water used should be lukewarm, excessively hot or cold baths being almost equally harmful.

Muscular exercise forms a very important part of the preparation for labor, in itself distinctly a muscular performance by no means inaptly comparable to the feats of endurance for which athletes undergo a long course of training, and it is therefore important that every patient should be encouraged to take, during pregnancy, as much light exercise as can be performed without undue fatigue; but violent exercises and those which involve jarring motions of the body should be especially forbidden, the shock occasioned by jumping from even low elevations being an especially common cause of miscarriage. An abundance of fresh air is of the first importance; but unless the patient is able to walk freely, is often secured with difficulty, since the constant jarring incident to the motion of a carriage is frequently productive of fatigue and of a sense of weight and aching in the back, and is then distinctly to be avoided. Railroad journeys of any length should be avoided during pregnancy. The absence of avoidable care and responsibility is especially to be desired, since the strain of social, educational, and business cares during pregnancy predisposes in the most marked degree to the excitement of the various nervous and mental disorders which frequently complicate the condition.

The increased leucorrhœa of pregnancy makes frequent bathing of the external genitals absolutely necessary to comfort, and prompts most women to the use of vaginal injections, which are permissible if the water used is neither hot nor cold, and does not exceed a half pint in quantity.

Coitus during pregnancy is not necessarily harmful, indeed, many women seem to be possessed with a special desire at this period, but excessive indulgence is an extremely frequent cause of miscarriage, and it is always best to avoid connection during the weeks in which the patient would have menstruated if not pregnant. Its frequency should properly be regulated by moderate restraint of the desires of the woman, and not, as is too frequently the case, by the appetite of her husband.

The dress, during pregnancy, should be loose, all tight lacing should be absolutely avoided, heavy skirts should be forbidden, and all the clothing of the lower part of the body should be buttoned to a special waist worn beneath the dress, in order to relieve the abdomen of its weight and secure its dependence from the shoulders. The corset is necessary to the comfort of many women and especially to those whose breasts are large and pendulous; it may, however, be well replaced by a linen waist which furnishes the necessary support to the breasts without exercising pressure upon the abdomen. Such garments are now commonly sold in most cities, or can be manufactured in the household. So soon as the increased prominence of the abdomen removes the skirts from contact with the thighs, a pair of warm drawers should be recommended. Circular garters should be absolutely forbidden on account of their tendency to produce or increase varicosity, and should be replaced by the elastic suspenders now commonly worn by women; these should, however, during pregnancy, be attached to the waist already referred to, rather than to the belt with which they are commonly fitted. The shoes should be broad and easy, and furnished with low flat heels.

Pressure upon the developing nipples should be prevented by looseness of the clothing, and if necessary, by the adoption of a nipple shield, but massage and pulling upon the nipple should be avoided, not only as injurious to the nipple itself, but on account of its tendency to provoke uterine contractions. Lactation during pregnancy should be discouraged on account of its tendency to disturb the digestion of the nursing child. The patient should be encouraged to lie down several times daily, and her sleep should be carefully watched, mild hypnotics being frequently necessary during the later months.

The urine should be examined in every case, and as a routine measure during the sixth or seventh month of pregnancy, and should suspicious symptoms arise, the examination should be frequently repeated.

The patient should be instructed to send for her physician at once upon the appearance of any abdominal pain, of even the slightest stain of blood upon her linen, of persistent headache or dizziness, of any epigastric pain, or on the recurrence of nausea after the usual vomiting of early pregnancy has disappeared. She should be cautioned to avoid lifting or stretching; *i.e.*, hanging pictures, placing a dress upon a high nail, etc.; she must be warned of the danger incident to even the slightest blows upon the abdomen, such as may be occasioned by the unguarded motions of a child, or of her husband when asleep; and if a primipara, should be informed that the pains of labor often closely resemble an attack of colic.

Special Disturbances of the Several Organic Systems During Pregnancy.

CIRCULATORY SYSTEM.

ANÆMIA.—Microscopic examinations of the blood of pregnant women have long ago established the fact that a mild anæmia is a constant element of that condition, and that it is only in aggravated instances, where evident loss of strength is observed, that the anæmic state assumes any pathological importance.

As a consequence of anæmia many pregnant women are subject to occasional attacks of syncope, an occurrence which need cause no alarm, unless the attacks are of long duration or extremely frequent. The same may be said of those somewhat annoying symptoms, dyspnœa and palpitation of the heart. As a consequence of anæmia, also, the majority of pregnant women find themselves the subjects, during the later months, of a slight, more or less transient, œdema of the ankles, finding, for instance, that it is necessary to wear loose boots, and that if toward the end of the day the boots are removed it is difficult to replace them. So long as the œdema is confined to the feet and ankles it is probably of anæmic origin and is of no importance, but its occurrence about the hands or face should always excite the attention of the physician, and is sufficient ground for an examination of the urine.

ŒDEMA OF ANÆMIC ORIGIN.—This is rarely sufficiently pronounced to need special treatment. If extreme, it is more likely to be relieved by general tonic and hygienic treatment, than by depletion in any form, since that would only increase the hydræmic condition upon which it is dependent. The anæmia of pregnancy may, in rare cases, and most frequently in multiparæ, take on a distinctly pernicious form, in which there is progressive loss of strength, emaciation, and all the classical symptoms of progressive, pernicious anæmia, but this type arises by slow gradations from the ordinary form and no sharp line can be drawn between them.

Treatment of Anæmia.—The first and most important rule of treatment is that, to be effective, it must be undertaken during the early stages of the affection. The cause of the disease, *i.e.*, pregnancy, being non-removable under ordinary circumstances, the most that can be hoped from medicinal or hygienic treatment is the arrest of the disease. There is but little hope of its improvement until after delivery has been accomplished. To this end the patient should be put under treatment as soon as the classical symptoms of anæmia become distinctly prominent; and this is of special importance in case the patient is showing weakness in any other direction, most of the other affections of pregnancy being dependent, to some extent at least, upon a distinctly anæmic element; a statement which is especially true of the urinary and nervous complications. The treatment of the pernicious form of anæmia varies from that of the simple form only in the fact that it is necessary to carry out all the precautions in a more stringent manner, and that the increased importance of the condition makes the preferences of the patient distinctly less well worth consulting. As in the ordinary forms of anæmia, the first rank among medicinal agents must be ascribed to the various preparations of iron, the value of which may be increased by the addition of arsenic, but in the anæmia of pregnancy the adoption of proper dietetic and hygienic precautions is of even more importance than medicinal treatment. Avoidance of unusual exertion, or mental fatigue and disquietude, and the assimilation of an abundant quantity of nourishment are prime factors in treatment, but the digestive condition of the pregnant woman is such that it is rarely possible for her to obtain sufficient food by the ingestion of three large meals daily, as is the rule in health; it is therefore the best rule of conduct to prescribe the use of small quantities of the most simple nourishment at short intervals.

Simple animal foods, such as milk, eggs, and raw oysters (if the season permits), are to be preferred, but may be combined with smaller quantities of the simpler farinaceous foods, such as puddings, and bread not too recently baked, which if toasted should be but slightly browned and not buttered. These should be administered, in all cases, mid-way between the meals, and in extreme cases should be given in small quantities as often as every half-hour, or even every fifteen minutes. It is surprising to see how large a quantity of nourishment will sometimes be taken readily in this way by patients who are so devoid of appetite as to be utterly unable to eat the ordinary full meal.

The fluid preparations of iron are rarely well borne by the stomachs of patients of this class. The reduced iron or some similar preparation, in the form of a pill, combined, if necessary, with one-sixtieth of a grain of arsenic, and given three times a day, is in general the best prescription.

It is of course of the utmost importance to secure a free movement of the bowels, at least once daily, as no proper assimilation of food is likely to go on in the presence of constipation.

A sufficient amount of open air should be prescribed for all cases in which it can be obtained without undue fatigue. If driving is for any reason inadmissible, it is often well to dress the patient warmly and expose her to the sun before an open window once or twice daily, for a period of from half an hour to an hour, and in extreme anæmia the importance of an absolute avoidance of muscular exertion cannot be too strongly enjoined.

The fact that the pernicious anæmia of gestation is distinctly dependent upon pregnancy and terminates with it, of course suggests at once the question of the propriety of the induction of premature labor, miscarriage or abortion, but this question is to be answered in the case of anæmia, as in most other pathological conditions during pregnancy, by the consideration that there are two lives involved, and that that of the child must not be sacrificed till it is reasonably certain that any further prolongation of gestation would involve the loss of both lives; and it is not until the strength of the mother has been so far reduced that her ability to sustain the burden of pregnancy to its natural end becomes doubtful, that this question should be raised; but when once a doubt exists it should then be decided only after consultation with one, or preferably two, other physicians.

VARICOSITIES.—One of the most annoying of the occasional accompaniments of pregnancy is the gradual development of varicosity to a greater or less degree, in one or both of the legs and ankles. Though not a constant symptom it is unfortunately extremely common, and if it does occur is usually progressive, increasing in amount with the increased duration of pregnancy, subsiding after delivery in part, but seldom entirely, and usually recurring in a more and more marked form with each successive pregnancy. Dilatation of the veins of the vulva and vagina is less common and usually occurs only in the presence of a somewhat excessive varicose condition of the extremities. The dilated veins of either locality may reach a point at which rupture threatens, but this is fortunately rare. In cases in which rupture does threaten, the patient should be furnished with a small pad of folded linen to which a strap and buckle have been sewn, and shown how to apply it over a bleeding point, that she may be prepared for the emergency in case it should arise.

Treatment of the varicose condition should be undertaken early, not only for the sake of preventing any increase of trouble, but also because the existence of even slight varicosities exposes the patient in many cases to considerable dragging pain, and sense of fatigue in the affected member; but during pregnancy, no decrease of the varices can be expected, and indeed a complete arrest of the increase is unlikely.

The only effective treatment is that rendered by mechanical support of the dilated veins, and this can be secured, either by the use of the elastic stocking, commonly manufactured by dealers in surgical appliances, or by a properly constructed flannel bandage. The stocking is the more comfortable, the more elegant, and the less effective. It is also a decidedly expensive luxury. If used it should be constructed to fit the individual limb, after due measurement either by the physician or by an experienced maker; and in the latter case it is essential to success that the physician should personally inform the manufacturer of the localities at which pressure is most to be desired, it being especially necessary to avoid all constrictions above the seat of the varicosity.

The flannel bandage, though less comfortable, and more troublesome to apply, has the advantage of inexpensiveness, and of greater efficiency. It can be made by the patient, but the physician should be careful to give her accurate and detailed instructions about its preparation. It is better that it should be made from cheap rather than from expensive flannel, owing to the greater elasticity of the former. For a patient of ordinary size, one and one-half yards of flannel should be cut upon the bias, into strips of not less than four inches wide and not more than five; the pieces should then be stitched together by simple basting, without turning the edges. It should be rolled up before using and should be applied tightly from just above the roots of the toes to a point as near the groin as possible, whether the varicosity is confined to the lower part of the leg or extends over the whole member; care being taken to make the pressure rather less above than in the lower portion of the leg, and to avoid localized constrictions.

Whichever appliance is used should be put on before rising from bed in the morning, and should be taken off only after retirement for the night, so that the veins shall never be unsupported while the patient is in the erect position.

The rubber bandage that is occasionally used is mentioned only to condemn it. Its macerating effect upon the skin, and the itching which it causes, render it unfit for use in this affection.

THROMBOSIS.—Thrombosis of the veins of an extremity or in the pelvis may occur as a consequence of the stasis of pregnancy, but is more common after delivery, and then usually in cases in which antisepsis has not been strictly observed. The treatment of thrombosis during pregnancy consists mainly in the strict avoidance of any motion of the affected limb, in order to lessen the danger of embolism; and in order to secure strict local rest it is essential that the patient's whole body should be as far as possible motionless, it being well known that motion of one part of the body almost invariably involves some action of the whole muscular system. So soon then as thrombosis is suspected the patient should be put to bed and urged to preserve the utmost quietude possible—a precaution which must be maintained until sufficient time has passed without extension of the trouble, to warrant a belief that organization of the clot has occurred, and that the danger of embolism is past.

When the detachment of an embolus takes place, the gravity of the situation depends entirely upon the functional importance of that portion of the body at which the detached clot lodges, and the treatment is conducted upon the same principles as in any other case of embolism, the only obstetrical indication being that if miscarriage occurs spontaneously, labor should be expedited as far as possible.

Vulvo-vaginal thrombosis, the only form which merits especial description, occurs much more frequently after delivery, and will be fully described in the section which treats of the puerperium.

HÆMORRHOIDS.—Hæmorrhoids not uncommonly appear during pregnancy, but are seldom troublesome unless during the last few weeks or at the time of delivery.

An attack of painful hæmorrhoids during pregnancy must be treated upon the same lines which would be taken at any other time, with the single exception that the treatment must always be confined to mild and palliative measures, since any operative treatment would expose the patient to the dangers of an unnecessary abortion.

HÆMORRHAGE.—Bleeding during pregnancy is distinctly rare unless from obstetrically pathological causes, such as placenta prævia, hydatidiform mole, attempted abortion, etc. Should it occur in the absence of these conditions, the existence of endocervical disease, of a uterine polypus, of extreme congestion from prolapse, or of some other pathological condition should be suspected, it being probable that the majority of reported cases of menstruation during pregnancy are due to some such cause.

DIGESTIVE SYSTEM.

DYSPEPSIA.—Dyspepsia as such is a not infrequent accompaniment of pregnancy, but when uncomplicated by nausea rarely assumes importance, or needs any treatment other than that directed to the palliation of discomfort;[1] during the later months, however, and after the disappearance of nausea and vomiting, dyspepsia in the form of a burning pain through the whole upper digestive tract may cause considerable annoyance, but this symptom when present is usually due to an over-acidity of the gastric or other digestive secretions, and is generally best combated by the use of alkaline remedies.

Prophylactic treatment during the earlier months is of considerable importance. It is well known that pregnant women are liable to considerable variations in appetite, and often long for indigestible and improper substances; chalk, charcoal, slate pencils, high or even rotten meat, and excessively acid food being the most common objects; such patients should, however, be encouraged to subdue these abnormal inclinations, as their indulgence paves the way for the occurrence of dyspepsia at a later period.

When gastralgia is troublesome, the most agreeable, and on the whole, the most successful drug is the carbonate of magnesia. The patient should be furnished with a lump of this chalk-like substance, which she should keep in her pocket and should nibble whenever the necessity arises. Mildly alkaline mineral waters and the subnitrate of bismuth may also prove of value.

NAUSEA AND VOMITING.—Nausea, most marked in the morning and often accompanied by vomiting, occurs during the first three or four months of most pregnancies. It is often productive of extreme discomfort to the patient, and may even assume the so-called uncontrollable form. It usually appears during the second month, but is sometimes seen within the first few weeks; it normally disappears at some time during the fourth month, but may cease before that time with the most unexpected suddenness. Its recurrence at a later period is distinctly abnormal, and is always suggestive of eclampsia.

If the vomiting is not sufficiently constant to cause distinct emaciation it may be considered normal and left untreated, and the patient should then be encouraged to endure her discomfort in the expectation of its disappearance at the usual time, but when the vomiting becomes so incessant as to make it impossible for the patient to absorb a proper quantity of nourishment, and results in progressive emaciation and loss of strength, the condition is of the utmost importance, the prognosis is grave, and the consideration of treatment opens questions of the utmost delicacy.

TREATMENT OF THE UNCONTROLLABLE VOMITING OF PREGNANCY.—The treatment of this affection separates itself naturally into three divisions: the first embraces the hygienic management and the various methods of forced nourishment, is sometimes sufficient by itself, is applicable to all cases, and should always be pursued during the whole course of the affection; the second confines itself to the treatment of intercurrent gastric disease and of local disorders or malpositions of the cervix and uterus; and the third consists in the induction of abortion.

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[1] A symptom which should not be confounded with those of dyspepsia is the sudden occurrence of severe epigastric pain—a phenomenon which should always suggest the possibility of impending eclampsia.

DIET AND GENERAL CARE.—It is inadvisable to attempt to treat such cases by the temporary deprivation of food which is so often valuable in the management of vomiting after surgical operations, in gastritis, etc., as here the danger of fatal loss of strength outweighs any prospect of relief from such a method; on the contrary, and from the time that nausea begins to be troublesome, it is important that the patient should take food in small quantities at short intervals, and at the moment when it seems most likely to be retained. In some cases it is possible, by the administration of small quantities of nourishment immediately after vomiting, to secure sufficient absorption to keep up a fair degree of strength; the best preparations being those of the simple albumens which are capable of absorption with a minimum degree of exertion of the digestive organs; milk, milk mixed with lime-water or soda-water, Koumyss, Matzoon, raw eggs, either alone or mixed with milk, expressed beef-juice if obtainable, raw oysters in the season, or defibrinated blood, being kept at hand and administered as often as possible, without paying much regard to the sensations of the patient, the size and frequency of the dose being determined solely by observation of the amount which is retained.

In combination with this forced feeding it is of the utmost importance to secure quietude, vomiting being often more decreased by the maintenance of rest in a horizontal position than by any other single means. When the stomach refuses to retain a sufficient quantity of nourishment, temporary support may sometimes be gained by the use of rectal enemata. These should consist of milk, eggs, or expressed beef-juice, should not exceed three to four ounces in quantity, and are rarely retained if given oftener than once in six hours, though in a few cases it is possible to give them as often as once in three to four hours. It is important that these injections should be given quite slowly and gently, that the patient's position should be unchanged for some time after the injection, and that the anus should be supported by pressure from without by a towel held in the hands of the nurse, for a period of from five to ten minutes. The observance of these little precautions often makes the difference between success and failure.

A large variety of medicinal substances have been recommended for the treatment of this condition, few of which have, however, stood the test of practical trial. Those which are best known are the oxalate of cerium in five-grain doses, preferably combined with the subnitrate of bismuth in doses of from five to ten grains; the use of bicarbonate of soda dissolved in soda-water in the proportion of one drachm to a quart siphon and taken freely, is highly recommended by Fordyce Barker; and when all other medicinal treatment fails, relief is sometimes obtained, oddly enough, by chewing spruce gum. In some cases the application of cold to the cervical vertebræ, and to the epigastric regions, gives considerable relief.

TREATMENT OF LOCAL AND OTHER ORGANIC DISEASES.—It is always important in the treatment of these cases to make it a rule to endeavor, from the moment that nausea begins, to discover some assignable cause for the trouble. To this end the urine should be examined to exclude organic and functional disease of the kidneys, and the physician should subject the patient's whole system to careful scrutiny in order to satisfy himself that the nausea is really the peculiar vomiting of pregnancy, and not due to some intercurrent condition.

In a certain proportion of cases, moreover, the true nausea of pregnancy is dependent upon local uterine conditions which can only be determined by thorough specular and digital examination. It is probable that such lesions are frequently present in cases where the digestive disturbances never exceed normal limits, but it is certainly a clinical fact that when they are found in connection with severe vomiting, this symptom is frequently relieved by local treatment of the uterine lesions.

Erosions of the Vaginal Surface of the Cervix.—This affection is usually found on or about the everted lips of the lacerated cervices of multiparæ, but may occur upon the surface of the primiparous cervix. If it is found, the surface should be carefully dried with absorbent cotton and then thoroughly brushed with a ninety-five-per-cent solution of carbolic acid, or with a solution of nitrate of silver of a strength of sixty grains to the ounce.

The relief of extreme congestion, as evidenced by an unusually deep purple color of the vaginal walls and surface of the cervix, by the use of glycerin tampons or small, moderately hot, douches (100° to 105° F.), may be of distinct service in alleviating the vomiting, and under such restrictions the use of douches seldom results in an interruption of pregnancy.

Malpositions of the Uterus.—The correction of any prolapse which may be present, and even the elevation of a uterus which merely occupies a somewhat low position in the pelvis, is sometimes followed by the most happy results. Another and well-known cause of the vomiting of pregnancy is the existence of a retroversion, a condition which is especially dangerous on account of its tendency to result in prolongation of the vomiting to an unduly late period of pregnancy, and in incarceration of the uterus within the pelvis, and below the promontory of the sacrum. Should any such displacement be found, its immediate rectification should be the first step in treatment and is often followed by complete relief.[1]

Even in the absence of such lesions it has been found that the vomiting is frequently relieved by making a dilatation of the cervix, though why this should follow is still a matter upon which conflicting theories are held. Strange as it may seem, the occurrence of abortion after this operation is a rare accident, provided that the dilating instrument is not passed beyond the internal os, and that the membranes are not ruptured. Relief is sometimes obtained in this way, even though the cervix be patulous, and the internal os not especially small. Dilatation may be performed by the insertion of the index finger into the cervix, the pulp of the finger being pressed into the internal os, but not allowed to pass through it; but a preferable method is the use of the ordinary expanding steel dilators. These should, however, be used only through the speculum. The patient should be placed in Sims' position, the os exposed, and the length of the cervix measured by the passage of a full-sized uterine sound through the cervical canal until arrested by the internal os. The dilators should then be passed to the same depth and very slowly expanded till the internal os is sufficiently patulous to permit the easy passage of the finger through it and into contact with the membranes, when the operation is complete.

Artificial Abortion.—All the above-described methods having been given a fair trial and having failed to afford relief, the final question of the propriety of a resort to artificial abortion becomes prominent, and is always a difficult problem to decide. On the one hand is the consideration that if abortion is resorted to sufficiently early it never fails to relieve the vomiting and to place the patient in a position in which a rapid convalescence is to be expected; and that if it be too long delayed, that is if the patient is already in a condition approaching collapse, the added exhaustion of even a three-months labor is extremely apt to be fatal. On the other hand it is a fact that the most distressing vomiting may cease abruptly at any moment without apparent cause, and that in that case speedy recovery is also to be expected, even though the patient is already in a condition of extreme exhaustion.

The gravity of the situation is of course increased by the early appearance of exhaustion, and diminished by the maintenance of a fair degree of strength until near the point when a spontaneous disappearance of the vomiting may be looked for.

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[1] For a description of the operation of replacement see page 63.

The solution of the question must in any case depend to a certain degree upon the religious beliefs of the individual family, and upon their estimate of the relative value of maternal and fœtal life. It is the practitioner's duty to set the facts clearly before them, and to abide by their decision; but the question is so momentous that it is always wise to submit the case to the best consultants obtainable before expressing an opinion.

Among Protestant physicians and in Protestant families it is generally considered the best practice to advocate abortion when all other treatment has failed; when the vomiting is so incessant as to prevent the retention of a sufficient amount of nourishment, and shows no indications of decrease; when rectal alimentation has failed; when the patient's condition is growing worse day by day, and the pulse is steadily at or above one hundred and twenty beats per minute and still rising; but it is important to remember that patients are constantly lost by over-conservatism in the most skilled and experienced hands; that the final collapse often comes on rapidly, and that when the condition of constant vomiting is succeeded by real exhaustion and rapid pulse, the question which comes up is usually, not—"When shall abortion be done?"—but—"Shall abortion be done now, or not at all?" It is perhaps unnecessary to again remind the practitioner that this is an operation which can never be undertaken without manifest impropriety, unless after formal consultation with one, and preferably two other physicians, and after due examination of the patient by each consultant.

SALIVATION.—The excessive secretion of saliva which is usual in pregnancy is commonly slight, seldom causes trouble, and only rarely amounts to positive discomfort.

In the rare cases in which this is excessive, treatment unfortunately offers but little hope of relief. The frequent use of small doses of atropia has been recommended as permissible, but for the sake of the child and of the woman's general health, should be avoided if possible. Some relief is occasionally afforded by the frequent and persistent use of a solution of tannic acid as a mouth wash.

CONSTIPATION.—There is, during pregnancy, an especial tendency toward habitual constipation and an accumulation of fæcal material in large quantities—a condition which is probably due to an arrest of peristalsis as a reflex result of the mechanical pressure exerted by the enlarged uterus upon the intestines, and it is of extreme importance to the well-being of the patient, not only during pregnancy, but also during the puerperium, that this accumulation should be reduced to the least possible minimum, a result which can be obtained in most cases only by the habitual use of some mild cathartic from the time at which constipation is first noticed.

Among the large list of cathartics there are but few which can be used habitually without producing toleration, and the necessity of increasing the dose; and prominent among these are aloes and cascara sagrada, the two drugs which are most valuable in the constipation of pregnancy. The best form in which to prescribe aloes for patients who are able to take pills is the officinal pil. aloes et ferri, one pill t. i. d., the combination of aloes and iron being peculiarly suitable to the conditions of pregnancy. If this dose should prove too large for the individual patient, it is better to decrease the size of the pill rather than to diminish the frequency with which it is taken. Some patients also find it easier to take two pills of half the officinal size at a dose, than to swallow one of the usual size. With patients who are unable to swallow pills we may resort to the elix. rhamn. pursh. co. (N. F.) in dose of from ten minims to a drachm immediately after each meal, or to the following prescription,

Tr. aloe socot.,
Elix. tarax. co., ... āā ℥ ij.
M. S. Two teaspoonfuls after each meal.

URINARY SYSTEM.

URINE.—It was formerly thought that the existence of free albumin in the urine of pregnant women was a normal occurrence, but it has been lately found, by careful observation of a large number of cases, that it occurs in only twenty per cent of all cases, at least if the slight traces due to admixture of the urine with the leucorrhœal secretion, and to the lesser grades of cystitis be excluded from the list; and it has further been observed that one hundred women with albuminuria yield, upon the chances, nearly four times as many cases of eclampsia as an equal number of women in whose urine albumin is not found. The occurrence of casts is always pathological and suggests the gravest danger, even though they be of small size and merely hyaline or fine granular.

Throughout pregnancy it is not uncommon to observe a tendency toward concentration of the renal secretion, a symptom which is always suggestive of danger and which should always indicate watchfulness and appropriate treatment. In hysterical women and in some other cases also, an increase in the quantity and a decrease in the specific gravity is also frequently observed

—a condition which, like all variations from the normal, is to be suspected, and is sufficient ground for careful supervision of the patient. An increase in the frequency of urination is usual from the time that the distention of the uterus begins to exert an increased pressure upon the bladder.

These normal variations differ only in degree from pathological alterations which are dependent upon the existence of distinct functional disturbances of the secreting tissues, and though the question of the origin of these functional disturbances and even of distinct nephritis during pregnancy, is a subject which still furnishes matter for much discussion and difference of opinion among theorists, the clinical fact remains, that pregnant women are peculiarly subject to disturbance of the renal function, a disturbance which may be sufficient to give rise to that most serious of all obstetrical complications, eclampsia. The approach of this danger is signalized by the appearance in the urine of the symptoms characteristic of acute or subacute parenchymatous nephritis, *i.e.*, a decreased secretion of urine, with diminished total solids, and the appearance of casts and of albumin, in amount varying from a large trace to a quarter, or even one-half of one per cent, or more, according to the degree of severity of the trouble. These alterations of the urine are accompanied by a symptomatology closely analogous to that which precedes an impending uræmic convulsion in ordinary Bright's disease; the symptoms especially worthy of observation being frontal headache, frequently described as a dull pain immediately behind the eyes, disturbances of vision or of hearing, severe epigastric pain, recurrence of nausea and vomiting during the later months, and general œdema; it being noted, however, that the occurrence of œdema in the lower extremities possesses here but little significance, on account of its occurrence in pregnancy in the absence of renal trouble, but that œdema of the hands, face, and eyelids is of marked significance.

The œdema rarely needs special treatment, but may exceptionally become so extreme as to cause distention to such a degree as to threaten rupture or sloughing of the skin, which extreme distention is most common about the labia and vulvar orifice. Œdema of the vulva must be endured unless it becomes so extreme as to threaten gangrene, in which case it is usually rapidly relieved by multiple puncture with a surgical needle. This procedure is, however, open to the objection that it may furnish a point of origin for sepsis and that it usually precipitates labor. Some comfort may sometimes be obtained by the application of vaselin and warm cloths. Œdema of the ankles is best treated by the application of a proper bandage, and by raising the feet during the night. General œdema, if the patient be in good condition, is often greatly relieved by free catharsis, best obtained by the administration of salines.

Further discussion of these symptoms and of their significance will, however, be omitted here on account of their reappearance in the section upon eclampsia; it being more convenient, and more conducive to clearness, to group together the eclampsia of pregnancy, labor, and the puerperium, in a chapter especially devoted to that purpose.

VESICAL SYMPTOMS.—During the early months of pregnancy, as the uterus enlarges and increases in weight, and before its size is sufficient to lift it above the brim of the pelvis, it not uncommonly exerts sufficient pressure upon the posterior wall of the bladder to seriously diminish the capacity of that viscus; and, undoubtedly aided by reflex influences, produces in some cases a considerable increase in the frequency of micturition. This symptom, which, though inconvenient to the patient, is purely temporary; admits of no treatment, must be endured, and commonly becomes less annoying by the end of the third, or middle of the fourth month. From that time on, though moderate frequency is common, it is usually not sufficient to excite complaint, until it again becomes troublesome during the later months. At a period which varies from the end of the seventh to the beginning of the ninth month, the increase of the uterus becomes so great that the posterior wall of the bladder, closely attached as it is to the anterior surface of the uterus, is so far drawn upon and elevated in the abdomen, as to change the shape of the bladder from an approximately spherical form, to that of a flattened bag. Its anterior and posterior walls are now separated from each other by but a short distance, and are so crowded between the enlarged uterus and the abdominal wall that the sphincter is unable to resist the abnormal pressure. The frequency of urination at this time may be so great as to occupy almost the whole attention of the patient. It is, however, a symptom which again must be endured, and for which no appropriate treatment is possible.

In occasional cases the frequent repetition of the act of urination may excite cystitis—a phenomenon which is probably likely to occur only in bladders which have been the seat of previous inflammation. When cystitis is present it is to be recognized by the characteristic signs in the urine, *i.e.*, an increase in alkalinity, decomposition of the urine soon after its passage, and the presence in the sediment of large quantities of pavement epithelium from the bladder wall, together with, in extreme cases, an admixture of fresh blood. The only treatment usually necessary is the administration of mild alkaline and demulcent drinks, such as

Potass. brom.,
Potass. chlorat., ... āā ʒ i.
Extr. tritici repen., . . . fl. ℥ iv.
Aq. camph.
Aq., ... āā ℥ ij.
M. S. Teaspoonful in water three times daily.

or

Elix. buchu et pot. acet. (N. F.), ℥ iv.
M. S. Teaspoonful in water three times daily.

Excoriation.—The frequent passage of urine, especially if cystitis has been established, may produce an excoriation of the vulva and internal surfaces of the thighs, which is closely similar to that sometimes caused by an acrid leucorrhœa, and which may be the occasion of an intense pruritus. This trouble is best treated by carefully drying the parts with absorbent cotton or some other soft material after each urination, and then covering them thickly with a stiff vaselin. If this treatment be carried out with sufficient thoroughness to efficiently protect the skin from contact with the urine, it commonly yields prompt relief, though little can be expected from it unless the patient be gifted with sufficient intelligence and perseverance to devote herself closely to following the instructions given her.

Nervous System.

Neuralgias.—Whether the cause of the affection be the hydræmia of pregnancy, the presence in the blood of one or more substances which in ordinary health are promptly excreted, or whatever other reason may be assigned for its occurrence, it is certainly a fact that pregnant women are peculiarly liable to the functional derangements of sensation familiarly known to us under the name of neuralgia. These neuralgias may be found in any of the sensory nerves, but are especially common in two situations: in the regions supplied by the fifth or trifacial nerve, and by the nerves whose origin is in the pelvis. Trifacial or other general neuralgias should be treated upon the principles familiar in general medicine, there being but one special obstetrical indication, or rather contra-indication, to be observed. The neuralgia being dependent upon pregnancy, and therefore limited in its duration, no operative or other radical treatment should be allowed, and it is especially necessary to forbid the incautious extraction of teeth for the cure of persistent toothache during pregnancy, unless an examination of the mouth discloses the existence of an intercurrent dental caries. Neuralgia of the other branches of the fifth nerve, and of the cutaneous nerves in general, may be treated by external applications of aconite, camphor, or chloroform liniments, or of the menthol pencils now so familiarly used; but in this, as in other chronic and painful affections, the use of such sedatives as morphia or chloral is always to be avoided so far as possible; and if morphia be used, it is best given by hypodermic injection, and only by the physician himself.

Neuralgias of the nerves which traverse the pelvis, and of the great sciatic nerve in particular, are not uncommon in the later months of pregnancy, and are undoubtedly due to the effects of mechanical pressure upon the nerves themselves by the enlarged uterus or fœtal head. Though they usually disappear with the termination of pregnancy, they are still of some moment, for the reason that they furnish in some cases the origin and starting-point of permanent and troublesome sciaticas. Treatment upon general principles may and should be employed, though it is usually of comparatively little value; but an attempt at postural alteration of the fœtal position may, if successful, so far relieve the pressure as to cause the disappearance of the neuralgia.[1]

PRURITUS.—Pruritus, either of the cutaneous surface in general, or when limited to the genital organs, may occur in pregnancy as a pure neurosis and without visible alteration of the skin. When it is general or confined to the distended abdominal walls, relief may occasionally be obtained by keeping the skin constantly covered with cloths moistened in a solution of bicarbonate of soda or by prolonged bathing in the same solution. Cloths wet with linimentum saponis co., to which chloroform may be added in the proportion of a drachm to an ounce, or in a 1:100 carbolic acid solution may also afford relief; especially if at the end of each application the whole affected surface is thoroughly rubbed with vaselin.

Pruritus of the vulva and its neighborhood, if unaccompanied by any local pathological conditions, should be treated in the same way, but it is in most cases, even when unaccompanied by excoriation, in reality due to the existence of an acrid leucorrhœal discharge. Any active local treatment of this affection being not without its risks during pregnancy, the measures already spoken of under the head of cystitis should be first applied in all cases, but after the failure of these milder measures it is allowable, if the patient's discomfort be extreme, to permit the bi-daily use of gentle, tepid, vaginal injections, though the quantity of water used in these injections should never exceed a half-pint. They may best be composed of a solution of borax in the strength of a teaspoonful to a pint, or of a solution of tannin of similar strength. Should this treatment fail, it is probable that the vaginal leucorrhœa is distinctly dependent upon, and excited by, an acrid cervical discharge. In such an event a speculum examination should be made, and if erosions be found upon the vaginal portion, its surface should be painted with a solution of nitrate of silver, of a strength of thirty to sixty grains to the ounce; or a small tampon soaked in glycerite of tannin, in simple glycerin, or in glycerin to which powdered alum has been added, should be placed against the cervix and allowed to remain there over night. The tampon should always be small, and is best applied by the physician through the speculum. No application to the endocervical mucous membrane is ordinarily advisable.

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[1] See treatment of posterior positions of the occiput, page 211.

ABDOMINAL PAINS.—Abdominal pains, when not referable to an imperfect action of the bowels, are either due to the stretching of old inflammatory adhesions among the pelvic organs or to pressure upon, or other functional disturbances, of the abdominal nerves, and must be endured, there being no effective treatment for them.

MUSCULAR CRAMPS. — Some pregnant women are much troubled by frequent attacks of cramp in the extremities, which usually come on at night, and may often be prevented by general massage, administered just before their retirement for the night.

INSOMNIA.—Insomnia is often a prominent symptom, especially among women with unduly developed nervous systems. It should be endured, in all cases, until it reaches a point at which it is evidently causing distinct depreciation of health, mental or physical, and although it is then deserving of treatment, the greatest caution should be used in the administration of hypnotics, on account of the danger of the formation of a habit which is especially to be dreaded in patients who have already shown a tendency to insomnia when in the non-pregnant state. If, however, it should become marked enough to produce evident nervous exhaustion, recourse must be had to the milder drugs of this class, of which the bromides of potassium and sodium are the most commonly used, the bromide of sodium being thought to produce less gastric and intestinal irritation. If either bromide is used it is best given in small doses of from five to fifteen grains, repeated several times during the latter part of the day, as, for instance, at five, eight, and ten P.M.; rather than in one dose at bedtime. Sulphonal, grains v.-x., given at bedtime alone, or at eight P.M. and bedtime, is useful to many patients. Urethan, gr. xx. at bedtime, is of value in some cases, and is probably less objectionable than either of the other hypnotics mentioned. In obstinate cases with much nervous irritability, and especially in the presence of marked headache, the following mixture is frequently very valuable:

Pot. brom.,	℥ ss.
Chlor. hydrat.,	ʒ ij.
Extr. hyosc.,	gr. vi.
Aq.,	ʒ iv.

M. S. Teaspoonful at 8 P.M. and bedtime.

MENTAL CONDITION.—A state of mind peculiar to pregnancy, and which is distinctly a symptom of pregnancy, is not infrequently the cause of much discomfort to the patient and her family; and it is always important to emphasize to them the fact that the alteration in character and in temper which is apparent to everybody is not to be visited upon the patient as a voluntary change, but is a distinct and involuntary symptom of her condition. Not infrequently a patient, naturally good-natured, becomes, during pregnancy, irritable and suspicious to an extreme degree; often developing a desire to avoid her most familiar and dearest friends and relations, which is probably due to an effort to spare them annoyance, and to a knowledge of the fact that self-restraint is easier in the presence of strangers. This curious phenomenon appears most commonly at about the middle of pregnancy, increases gradually, may terminate by a similar decrease or may disappear suddenly, but more frequently lasts throughout the whole pregnancy if it has once appeared. It may deepen into the insanity of pregnancy, is always a reason for anxiety, may persist during the whole or greater part of the puerperium, and does not improve the prognosis for the patient's mental state in after-life. In case a tendency of this kind has been noticed, and is on the increase, the greatest watchfulness should be observed. The patient should be surrounded by cheerful, and if possible by unfamiliar and impersonal attendants. Every effort should be made to divert her mind and to keep her in public and amused, as much as may be possible without undue fatigue. She should be given, herself, a full explanation of the existence and cause of the phenomenon, and should be urged to use the strongest mental effort to control it. Her physician should direct his efforts mainly toward acquiring her entire confidence, that there may be at least one person who is able to comfort and relieve her, and who is in a position to discuss confidentially all the things which disquiet her, and to give an authoritative assurance of the visionary character of the griefs and embarrassments which surround her. In marked cases it is essential that his visits should be frequent and regular, and it is best that the necessity for such attendance should be explained, not only to the patient, but to the husband or other responsible relatives.

With the exception of the administration of hypnotics to combat sleeplessness, more freely than in other conditions, there is no special treatment for this state beyond the watchfulness already spoken of.

CUTANEOUS AFFECTIONS. — Brownish discolorations of the skin of the forehead and other portions of the body are not unusual during pregnancy, but commonly disappear after delivery, and need occasion no alarm.

LOCOMOTOR SYSTEM.

DISTENTION.—During the later months of pregnancy the rapid increase in the size of the uterus produces an increase in the abdominal pressure, which by elevation of the diaphragm and consequent encroachment on the thoracic space may produce dyspnœa, which is, however, rarely of sufficient amount to need special notice, being commonly about equivalent to that which is so frequently observed in anæmic girls. This increase of abdominal pressure may also cause obstruction of the venous circulation, to a degree sufficient to give rise to œdema, or to increase that which already exists. The rapid increase of weight which is common at this period may also so far disturb the patient's balance as to make her unwieldy, and liable to falls. This is especially likely to occur in the presence of multiple pregnancy, or of an undue quantity of liquor amnii.

Where the undue distention is due to multiple pregnancy, no treatment is possible, unless it should become so extreme as to call for the induction of premature labor, which in such cases would not improbably appear spontaneously. When due to hydramnion it demands the treatment proper to that condition.

RELAXATION AND SOFTENING OF THE PELVIC SYNOSTOSES. —Relaxation of all the ligamentous connections of the pelvic bones is proper to pregnancy, but ordinarily produces no effect, unless it be a feature in the production of the characteristic gait. If extreme, it may give rise to considerable difficulty in locomotion —an annoyance which may usually be lessened or relieved by the application of a proper belt. This should not be less than three inches broad, should be made of leather, canvas, or other firm material, and should be applied around the pelvis in the space between the iliac crests and the trochanters.

RELAXATION OF THE ABDOMINAL WALLS.—This is most likely to occur in women who have borne several children, and usually only when the confinements have followed each other with considerable rapidity. It gives rise to the malposition known as anteversion of the pregnant uterus, in which the fundus may reach, in extreme cases, a position below the symphysis, or may even rest upon the thighs, this displacement being rendered possible by the distention of the tendinous central raphé and overlying skin, after separation of the recti muscles. It is productive of much fatigue and dragging pain, but may be relieved by the application of a proper binder, such as is shown in Fig. 2. The essential points in the application of this bandage are that it should be drawn firmly around the pelvis in the space between the trochanters and iliac crests and that it should be sufficiently high in the back to give firm support in the direction of the dotted lines in the figure.

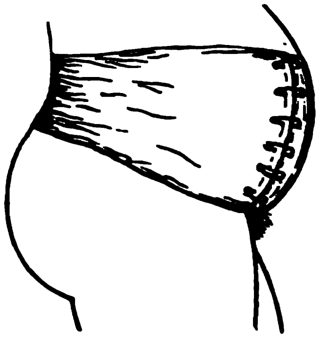

FIG. 2.—BINDER FOR RELAXED ABDOMINAL WALLS.

CHAPTER IV.

INTERCURRENT DISEASES IN PREGNANCY.

PREGNANT women are equally liable with others to many of the ordinary diseases which afflict mankind; and since a large proportion of these diseases are influenced in their clinical course by pregnancy, or themselves exert an unfortunate influence upon its duration, it is highly necessary that every obstetrician should be equipped with a competent knowledge of the special relations between general disease and the practice of midwifery.

THE EXANTHEMATA.—Continued high temperature is by itself unfavorable to the continuance of pregnancy, but the exact amount of effect observed, depends greatly on the individual disease which is the cause of the pyrexia.

Variola.—Small-pox, if mild, is often survived by both patients; but if severe is almost invariably fatal to the child, and usually to the mother; the confluent form of variola commonly resulting in the death of both patients.

Scarlatina.—Scarlet fever is a very dangerous complication of pregnancy, and one which is usually fatal to the child, even though the mother survives; the death of the child in such cases, of course, usually precipitating miscarriage. In mild cases the prognosis for the mother is but little altered by her pregnancy; in severe cases the exhaustion of a probable miscarriage, and an increased liability to scarlatinal nephritis, endometritis, metritis, ovaritis, and other inflammations of the pelvic organs, renders the prognosis distinctly worse. Treatment is unaltered and the induction of labor should be avoided.

Rubeola.—Measles almost invariably causes abortion or miscarriage, and usually results in the death of the child, unless it occurs within the last few weeks of pregnancy. It has almost no danger for the mother.

Erysipelas.—The prognosis of erysipelas is about equivalent to that of measles.

TYPHOID FEVER.—When this disease occurs during pregnancy it is followed by miscarriage in all but the most extremely mild cases, and even in those the life of the child is rarely preserved. The prognosis for the mother is only altered by the fact that to the exhaustion of typhoid is superadded the exhaustion of parturition and the puerperium, but this factor may be sufficient to turn the scale, and always increases the gravity of the prognosis; which becomes worse in proportion as the advancement of pregnancy augments the exertion of labor. The treatment is unaltered except that the question of the induction of labor becomes a prominent one. It may be taken for granted, in all but the most extremely mild cases, that the life of the child is necessarily to be lost, and it is therefore evident that the physician's chief object should be to secure the occurrence of labor at that period of the disease at which it will be least harmful to the mother. It is, on the one hand, extremely unwise to subject the patient to the fatigue of a prolonged or difficult induction of labor, and on the other, it is much better for her to undergo the exhaustion of parturition at a period when her vitality is still comparatively good; but the exact period at which labor should be induced must be determined in each case by a careful consideration of the mother's condition, in connection with the probable behavior of the uterus during the induction of labor, an estimate of which can be obtained only by a vaginal determination of the rigidity of the cervix, and of the degree of irritability of the uterus, these facts being considered in connection with the past history of the patient, if a multipara. The occurrence of a spontaneous miscarriage is always to be hoped for, as much the more favorable event.

PNEUMONIA.—Acute lobar pneumonia is a somewhat frequent complication of pregnancy, being a disease to which pregnant women seem to have an increased susceptibility. It is almost invariably fatal to the child, and its dangers to the mother are increased by the diminished thoracic space due to crowding of the abdominal organs by the enlarged uterus and the consequent elevation of the diaphragm.

The induction of labor is rarely wise, owing to the fact that in a large proportion of cases the sudden disappearance of the intercurrent disease allows parturition to take place during convalescence, and at a period when the mother is much better able to bear it. The later the period of pregnancy at which pneumonia appears, the worse the prognosis for mother and child.

PLEURISY.—The course of pleurisy is but little affected by the existence of pregnancy, and on the other hand this disease rarely exerts any injurious effect upon the course of gestation.

PHTHISIS.—Tuberculosis, whether thoracic, abdominal, or general, exerts but little influence on the course of pregnancy, even in the somewhat advanced stages; the nutrition of the child being sometimes curiously good, although the emaciation of the mother may be extreme. Labor in phthisical patients is usually very easily accomplished on account of the laxity of the soft parts. The fœtus is not infrequently weak, is generally small, and sometimes badly nourished. The induction of labor is rarely justifiable; patients in an almost hopeless condition sometimes delivering themselves with extreme ease, and making a surprisingly rapid, temporary improvement—an improvement which is, however, often followed by an equally rapid decline. In case the destruction of the pulmonary tissues is so extensive as to cause extreme dyspnœa during labor, it is always proper to terminate delivery as soon as the os is well dilated; and operative interference is then usually easy, but is comparatively rarely necessary.

The influence of pregnancy on phthisis is a matter on which there is still some conflict of authority; the old opinion that phthisis was favorably influenced by pregnancy still having some adherents; but the more modern view is that phthisical patients should avoid pregnancy if possible, for their own sakes as well as for that of the community, which certainly needs no increase of individuals with an hereditary predisposition to tuberculosis.

In patients of phthisical family history but previously healthy, the disease not infrequently appears during pregnancy or the puerperium, or shortly after the occurrence of an abortion.

CARDIAC DISEASE.—During pregnancy, the heart undergoes a physiological hypertrophy, which is required as a compensation for the increased arterial and venous pressure incident to the development of the uterus. Even with a normal organ, this hypertrophy fails to entirely overcome the obstacle to the circulation; and the dyspnœa and œdema, which are so common during the later months of pregnancy, are undoubtedly, at least partly, of cardiac origin. When the heart is the subject of preexistent valvular disease, these symptoms usually become severe; and in extreme cases such a condition may occasionally lead to the appearance of sudden and severe pulmonary congestion, œdema, ascites, albuminuria, or metrorrhagia.

The fœtus is not infrequently feeble and poorly developed, and may even die *in utero* of impaired nutrition, the result of an imperfect placental circulation. Mitral lesions are more dangerous than aortic; and of mitral lesions, stenosis is by far the more dangerous. Acute endocarditis has, during pregnancy, a marked tendency to assume the ulcerated form; pericarditis is not perceptibly affected; the majority of women with valvular cardiac disease pass through pregnancy without serious harm, though they usually suffer extreme discomfort.

Treatment.—Rest, freedom from care, and a free use of digitalis and iron, are all of great value in preventing an increase of trouble and in tiding the patient along till her pregnancy reaches its natural end. In very rare cases the mother's life may be so seriously threatened as to render the induction of premature labor advisable.

CHOLERA.—The prognosis and treatment of cholera are but little influenced by the coexistence of pregnancy. Its duration is so brief that it has either killed the patient or has disappeared before the pelvic organs are awakened to activity. Statistics show that from one-third to one-half of the patients attacked recover, and that of these about one-half subsequently abort, most of the children being born dead, even though the period of viability has been reached.

INTERMITTENT FEVER.—Repeated observations have established the fact that pregnant women are equally, if not more, liable to attacks of this disease than are the non-pregnant, and it is highly probable that in many instances the fœtus undergoes attacks which are synchronous with those of the mother. The intermittent fever of pregnant women differs, however, from the ordinary form, in the fact that during its persistence a continuous mild pyrexia is usually observed, the paroxysms being, of course, marked by increase of fever.

It is highly probable that women who are the victims of this disease are more liable to abortion, miscarriage, and premature labor than other patients; but this increase of liability is probably not great. The supervention of labor arrests the attacks, but they usually recur during the puerperium, which appears to be especially favorable to their occurrence when a predisposition to the disease exists, and this even in cases in which they have failed to appear during the existence of pregnancy.

It has been objected to the usual treatment by quinine, that the powers of that drug as an abortifacient renders its use during pregnancy improper. The constant experience of the profession in malarial regions, casts, however, grave doubts upon its possession of this property, and it is now usual to treat intermittent fever during pregnancy exactly as it is treated at other times.

ICTERUS.—Jaundice during pregnancy may occur in two forms; a mild icteric condition, or the so-called severe icterus of pregnancy. In the first form the symptoms are mild and the pulse slow, usually less than a hundred. In the grave form the symptoms are severe from the start, the pulse is high, usually above one hundred and twenty, and exhaustion to an extreme degree occurs early, and grows rapidly worse. The mild form is of but little importance, and exerts no influence on pregnancy; the severe form always causes abortion, followed by severe and usually fatal collapse. The distinction between the two forms can only be made clinically after the lapse of some little time, and even then they are to be distinguished only by the severity of their symptoms. The treatment is symptomatic, and is in no way different from that of icterus in the non-pregnant state.

SYPHILIS.—When pregnancy occurs during the active stages of syphilis the course of the disease seems to be much aggravated by the pregnant condition, and there is an especial tendency toward the occurrence of mucous lesions, which are also of unusual duration and severity. The usual treatment should be at once and energetically entered upon, but controls the disease with much less certainty than among other patients. In such cases pregnancy usually terminates in the early months by a spontaneous abortion, and this is generally followed by a decrease in the severity of the symptoms, at least if treatment be systematically pursued.

During the primary and secondary stages of syphilis, and in fact, during the first three to five years after the occurrence of the initial lesion, abortion is the rule, and delivery at term a comparatively rare exception. In general in syphilitic patients, successive abortions occur at later and later periods, to be finally followed, should conception again take place, by the birth of a living child at term. Such children may present some evidences of inherited syphilis at birth, or may be apparently healthy; and in this latter event, may either develop symptoms of the disease with fatal or non-fatal results shortly after birth, or may continue healthy.

A systematic administration of mercury and the iodides from the date from which conception is suspected, offers the only basis of hope for the prolongation of pregnancy to term, and occasionally results in the birth of living children.

The possible transmission of syphilis to the child by a previously diseased father, without propagation of the disease to the mother, remains a question of some doubt, but is still held to occur, for which reason the administration of anti-syphilitic treatment during the whole of pregnancy is always to be recommended for any case in which miscarriages have previously occurred, and in which either parent is known to have been infected. If the mother has been subject to the disease, such treatment is proper as a matter of routine, even though no symptoms are apparent at the time; since abortion not infrequently occurs as a consequence of syphilis when no other evidences of the disease are present.

HYSTERIA.—Hysteria has no effect upon the progress of pregnancy. The influence of pregnancy on hysteria, on the other hand, varies greatly in different cases. It is probable that in those instances where the hysteria is due in whole or in part to an imperfect development of the pelvic organs, it may be greatly ameliorated, or even cured, by the increased nutrition of these organs consequent upon the development of the uterus; but the constitutional element which is prominent in most cases of hysteria, so far from being benefited by the supervention of pregnancy, is usually increased by the exhausting effects of the process of child-bearing; and hence repeated pregnancies are much to be feared for such women.

CHAPTER V.

THE OBSTETRIC COMPLICATIONS OF PREGNANCY.

HÆMORRHAGE DURING PREGNANCY.—Hæmorrhage during pregnancy always suggests placenta prævia, hydatidiform mole, or threatened accidental termination of the gestation. Placenta prævia belongs more especially among the accidents of labor, and will be discussed in a special chapter under that heading.

HYDATIDIFORM MOLE.—Hydatidiform moles are formed by a degeneration of the chorion, and its metamorphosis into a multitude of small cysts, which contain a thin jelly-like fluid and are joined together in grape-like clusters by slender and very vascular stems (Fig. 3). The degeneration ordinarily begins during the first three months and before the formation of the placenta; and in this case always causes an arrest in the development of the fœtus, which is subsequently absorbed, while the mole in the course of its growth fills the entire uterine cavity. It may exceptionally develop itself at a later period and after the formation of the placenta; in which case the development of the fœtus may go on for some time alongside of the mole; and instances have been reported, in which, in twin pregnancy, one amniotic sac was completely filled with mole, while the other contained a healthy fœtus.

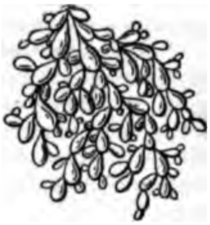

FIG. 3.—HYDATIDIFORM MOLE.

The rapid distention of the uterus, which is the result of the growth of the mole, is usually resented by that organ, and results in premature delivery, at a time when the uterus has about reached the size of a six-months' pregnancy, but it may exceptionally form a tumor of a size equal to that of the normal uterus at term; the liability to serious hæmorrhage increasing in proportion to the increased size of the uterus.

DIAGNOSIS.—The most distinctive sign of the existence of hydatidiform mole is the rapid increase of the uterus to a size greater than that which would naturally correspond to the estimated period of pregnancy, together with a peculiar and characteristic, elastic, doughy feel of the fundus. It is commonly accompanied by marked sacral and bearing-down pains, and general pelvic discomfort; and by the other symptoms which belong to rapid distention of the uterus. As a rule, too, the existence of an hydatidiform mole is signalized by an occasional discharge from the vagina of a thin, pink, serous fluid, which is most apt to be seen at the times when the menstrual periods would have been expected. This discharge may contain cysts, the presence of which is of course sufficient ground for an absolute diagnosis. It may often be distinguished from hæmorrhages due to placenta prævia by the fact that it usually begins before the termination of the first three months, that is, at a period when placenta prævia is, of course, impossible. The non-existence of a fœtus may be determined by the absence of ballottement, in spite of the fact that the uterus is of the size proper to the fifth or sixth month, and this sign becomes strongly suggestive of the existence of a mole at a period which corresponds as a general rule to about the termination of the fourth month of pregnancy, as calculated by the menstruation. At a later period, the absence of the heart-beats and of the fœtal movements also furnishes evidence of the absence of the fœtus, though the movements are not infrequently closely simulated by irregular contractions of the uterine muscle.

PROGNOSIS.—When the increase of the mole is arrested, spontaneously or by art, at an early period, the prognosis is generally good, but if it is allowed to persist until the uterus has attained a large size, the increased danger of profuse flooding during delivery renders the prognosis decidedly grave. For this reason interference is justifiable and to be advised, as soon as the diagnosis is made.

TREATMENT.—If the diagnosis has been established before the appearance of labor, its immediate induction is always to be advised, and if the diagnosis is not made until after the spontaneous appearance of labor, its progress should be expedited, and delivery completed in the most rapid manner possible; but the method to be adopted for the induction or acceleration of labor must depend mainly upon the firmness of the cervix and upon the size to which the uterus has already attained. If at the time when an operation is decided upon, the consistency of the cervix is such that its manual dilatation promises to be a difficult and prolonged operation, it may be better to defer interference until the cervix has become softened by the progress of labor, which, if present, may be expedited; if absent, may usually be excited by any of the other means recommended for the induction of artificial miscarriage.[1]

Should hæmorrhage occur during the early stages of dilatation, it may be checked, if the size of the uterus be less than that proper to the fifth month of pregnancy, by the use of the vaginal tampon recommended in the treatment of incomplete abortion; but, even after the adoption of this precaution the danger of exhaustion from hæmorrhage is so great that it may be laid down as a general rule, that with labor in progress and a diagnosis of hyadatidiform mole established, the physician should not leave the bedside of his patient until delivery has been accomplished, but should maintain throughout the progress of the case a careful watch upon the pulse, that he may be ready to adopt a more active form of treatment at the first sign of the existence of concealed hæmorrhage, as revealed by increasing frequency and diminishing force of the patient's heart. The tampon should, in any case, be removed so soon as an increase in the pain renders it probable that the cervix has become softened, and that dilatation has progressed to a point which will permit the removal of the offending cysts. If, at the time of operation, the size of the uterus exceeds that of the fifth month of normal pregnancy, extreme firmness of the cervix is much less often found and the increased danger of concealed hæmorrhage by passive dilatation of the uterus after the insertion of the tampon is so greatly increased, that it is usually safer to proceed at once to manual dilatation of the cervix under ether, in the manner recommended for the induction of premature labor and the acceleration of labor at term.

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[1] See pages 143-147.

So soon as the size of the os permits the passage of the fingers to the fundus, the contents of the uterus should be withdrawn by the method used in the manual removal of the secundines after miscarriage.

When hæmorrhage begins during the process of dilatation, every effort must be made to hasten the evacuation of the uterus, for no diminution of the bleeding can be hoped for till the complete removal of the growth has been accomplished, and when this has been once effected all danger of bleeding generally ceases. In case, however, a slight hæmorrhage does continue, after an apparently complete removal of the growth, the walls of the uterus should be lightly scraped with a blunt wire curette, and then, if hæmorrhage continues, thoroughly swabbed out with Churchill's tincture of iodine or a weak solution of the persulphate of iron, made by adding to Monsel's solution enough warm water to give the mixture the color of pale sherry. The delivery may wisely be succeeded by the administration of a drachm of the fluid extract of ergot, and should always be followed by an antiseptic intra-uterine injection.

Should the hæmorrhage be sufficient to cause collapse, this should be treated after the ordinary rules of collapse from simple hæmorrhage.[1]

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[1] See page 286.

EXTRA-UTERINE PREGNANCY.

Extra-uterine pregnancy, or ectopic gestation, consists in the attachment and growth of an impregnated ovum at any point other than its natural seat in the uterine cavity. Such an arrest has been reported to occur within the Graafian follicle; and some authorities still teach that impregnation may take place there, or while the ovum is free in the abdominal cavity, and result in the attachment of the placenta to the surrounding viscera; whether this be possible or not, the interior of the Fallopian tube is now generally believed to be the most common seat of ectopic gestation.

Tubal pregnancy is classically divided into three forms: interstitial pregnancy, in which the ovum develops in that portion of the tube which is within the uterine wall; tubo-ovarian, in which the ovum develops in the mouth of the tube, in close proximity to, or in actual contact with the ovary; and true tubal pregnancy, in which it occupies an intermediate position.

ADOMINAL PREGNANCY.—It is now believed that abdominal pregnancies almost, or wholly, without exception, are originally tubo-ovarian, or are the result of tubal pregnancies in which, from some rare set of circumstances, an intra-peritoneal rupture is followed by the continued development of the fœtus and placenta. These, which are by far the most rare, are probably the only instances in which ectopic gestation can endure until term.

Interstititial pregnancy, and pregnancy in the rudimentary cornu of a one-horned uterus cannot be differentiated from ordinary tubal pregnancy, unless by laparotomy, and are, therefore, rather anatomical curiosities than of practical importance.

TUBAL PREGNANCY.—If tubal pregnancy occurs and is allowed to progress without treatment, it must terminate, in the course of time, in the rupture of the tube, unless the growth of the ovum is arrested by the accidental death of the fœtus; should this occur before rupture, the ovum shrinks from the absorption of its fluid contents by the surrounding tissues, and this shrinkage is commonly followed by complete absorption of the but slightly developed fœtus and its envelopes; if, however, its life continues, the increase of the ovum is so much more rapid than the develoment of the tube that the walls of the latter become progressively more and more distended and thin, until their rupture occurs, when the result that follows is dependent upon the situation of the rent.

Extra-Peritoneal Rupture.

It must be remembered that the tube is contained between the layers of the broad ligament, and that these are considerably separated by its rapid distention, so that a considerable portion of its circumference is usually extra-peritoneal at the time of rupture; *i.e.*, is covered only by the connective tissue which separates the peritoneal surfaces of the broad ligaments. Should the rent be situated in this portion of the tube, the blood poured forth from the uterine vessels is contained between the layers of the broad ligament, and its effusion results in the production of a pelvic hæmatocele by dissection of the connective tissue, so that although the loss of blood is often sufficient to produce well-marked collapse, the extent of the hæmorrhage is in fact controlled by the capacity of the inclosed space within which it finds itself. Three terminations are then possible; the effused blood, with the contained fœtus, may be rapidly absorbed, and the case terminate in prompt recovery; its continued presence may result in the formation of a pelvic abscess; or the fœtus, if somewhat more developed than usual, may undergo a process of calcification and of conversion into the abnormality known as a lithopædion. Such a calcified fœtus may become encysted and remain within the body without injury to the life of the mother for an indefinite term of years; or its presence may, upon the other hand, in time provoke the formation of a pelvic abscess, and thus result in the eventual discharge of the fœtus piece by piece, through the rectum, vagina, or even the external skin. In exceptional cases, the attachment of the placenta to the tube may be uninjured by the rupture, and the development of the child may then progress normally for a considerable period, or even to full term. In such a case, a secondary rupture into the peritoneal cavity is not unlikely to occur.

Intra-Peritoneal Rupture.

It may occasionally happen that a rupture through the peritoneal covering of the tube fails to involve vessels of sufficient size to produce fatal hæmorrhage. In these rare cases the development of the placenta may continue until its increase causes its edges to emerge from the cavity of the tube and form secondary attachments upon the neighboring peritoneal surfaces. In such rare cases, the presence of a child within the abdominal cavity usually results in the formation of adhesions between the surrounding viscera, and thus forms an encysted cavity in which its development may progress to full term or longer. In these cases the advent of term is announced by the appearance of uterine contractions which simulate those of labor, and result in the expulsion of the false decidua which is usually developed in the uterine cavity; labor then subsides and the child, if not removed by laparatomy, soon dies; it may then be converted into a lithopædion, but its death is much more commonly followed by a process of decomposition, and a consequent septic absorption, which, if unrelieved, commonly terminates in the death of the mother. More usually, an intra-peritoneal rupture of a tubal pregnancy is followed by intra-abdominal hæmorrhage, which, if not promptly controlled by ligature of the offending vessels, can result only in the death of the patient.

DIAGNOSIS OF EXTRA-UTERINE PREGNANCY.—A diagnosis of extra-uterine pregnancy may occasionally be made before the occurrence of rupture; it is then dependent upon the co-existence of the ordinary signs of pregnancy with a but slightly enlarged uterus and a rapidly-growing tumor in the region of one or the other broad ligament; pain is usually a prominent symptom, menstruation is usually not arrested and is frequently attended by the discharge of small shreds of tissue or even a complete decidual cast of the uterine cavity, but the characteristic increase of the tumor must be detected by repeated examinations before a reasonably accurate diagnosis can be established. Ballottement can sometimes be obtained in the tumor and is then a pathognomonic symptom. More commonly the condition remains unsuspected until it is announced by a sudden and unexplained collapse attended by a feeble, rapid pulse, a blanched countenance, jactitation, and all the signs of internal hæmorrhage. When such an unexplained collapse occurs in the person of a woman who has been exposed to a possible pregnancy, the probabilities are enormous that it is to be explained by the rupture of a tubal pregnancy, and if no other cause is found, the conduct of the physician should be decided by the existence or non-existence of the physical signs of pelvic hæmatocele; *i.e.*, by the presence or absence of a rapidly enlarging, soft, boggy tumor occupying the greater portion of one side of the pelvis.

TREATMENT BEFORE RUPTURE.—If a reasonably probable diagnosis has been reached before the occurrence of rupture, two methods of treatment are at present believed to be permissible: an attempt may be made to destroy the life of the fœtus by means of electricity, or the offending tube may be removed by laparatomy. The choice between these plans has given rise of late to a most extended discussion, and is still far from settled, but the view which seems most reasonable is that if a fairly probable diagnosis has been established at or before the middle of the third month, and if the presence of a purulent salpingitis can be positively excluded, an attempt at the destruction of the fœtus by electricity is to be advised; but this should only be intrusted to an experienced electrician, and even then it is improper to attempt it unless some one near at hand is ready to do a laparatomy at short notice, since there is always a possibility that the application of the current may result in immediate rupture; while an error in diagnosis is also always possible, and the application of the current to a tube distended by pus would probably result in the production of a septic peritonitis. The establishment of the diagnosis is always a matter of such extreme difficulty that if the physician in charge of the case knows himself to be untrained in this direction, it is not only his duty, but by all means his best policy to place the patient in more experienced hands; and should this be impossible it is probably better to counsel delay in the hope that the diagnosis is incorrect, rather than to undertake a course of treatment which is surrounded by such great danger for all but the most expert. If the diagnosis is established before rupture, but not until after the tenth week of gestation, it is probably the better practice to resort at once to laparatomy in preference to the use of electricity.

TREATMENT IMMEDIATELY AFTER RUPTURE.—If the rupture, when announced by collapse, is extra-peritoneal, *i.e.*, attended by the formation of a well-defined hæmatocele, a conservative policy is to be recommended. Absolute rest in bed with the head lower than the pelvis, should be strictly enjoined; the patient should be put upon a low diet, stimulants should be withheld and opiates administered in moderate quantities, p. r. n.

If the collapse is unattended by the formation of an intrapelvic tumor; *i.e.*, if the blood is flowing into the abdominal cavity, nothing can save the patient except immediate laparatomy. The abdomen should be opened with the utmost speed, and the operator should not allow his attention to be diverted by the blood which wells up from the pelvic cavity, but should at once search for the fundus of the uterus, compress the offending tube with the fingers and, after bringing it to the surface, should tie off the broad ligament which supplies it, and remove the tumor; the technique of the operation being in all respects precisely similar to that employed in the removal of diseased tubes and small ovarian tumors.

TREATMENT AFTER RECOVERY FROM COLLAPSE.—In the event of the continued development of the child after rupture, or in the so-called abdominal pregnancies, if the condition is undetected until the child is viable or until the period of viability is close at hand, it is best to defer the operation at least until term; when an experienced laparatomist may feel justified in performing an immediate or primary operation, in the hope of saving the life of the child; but the danger of a promptly fatal hæmorrhage from partial detachment of the placenta is so great, that it is better practice for any but the most expert operators to wait for the death of the child, as evidenced by the disappearance of its heart sounds and the arrest of placental circulation, before attempting extirpation. This latter point is to be determined by the occurrence of a shrinking of the tumor, due to the absorption of the liquor amnii, which usually follows upon the failure of placental nutrition, but should any signs of septic absorption appear before this event occurs, that is in itself a sufficient indication for an immediate operation.

ABORTION, MISCARRIAGE, AND PREMATURE LABOR.

Premature terminations of pregnancy are usually divided according to the time of delivery into: abortions, those which occur during the first three months; miscarriages, from that time till the end of the seventh month or until the fœtus has become viable; and premature labors, after that period.

Abortion.

The symptoms of a threatened abortion are the presence of a sense of uneasiness, weight, and dragging, in the back or pelvis and in the supra-pubic region, the occurrence of hæmorrhage, and of uterine contractions. Treatment divides itself naturally into prophylaxis, the treatment of threatened abortion, and the treatment of abortions which have become inevitable.

PROPHYLAXIS.—The occurrence of abortion is the product of two factors, a pre-disposing and an exciting cause, and it is probable that some pathological condition is present in most women who abort without special reason, for nothing can be more striking than the contrast between the accidents and injuries which some women sustain without miscarriage, and the extremely trivial causes which are sufficient to excite it in others. It is probable that abortion is usually preceded by a separation of the decidua from the uterine walls, or by some alteration of the fœtal envelopes, due to pre-existing disease, and that the connection between healthy decidua and the uterine walls is such that a separation is unlikely to occur; while it is, on the other hand, easily produced in the case of membranes whose condition has been altered by pre-existing disease, or by great uterine congestion.

PREDISPOSING CAUSES.—The conditions which are more usually responsible for the occurrence of abortion are, syphilis, profound anæmia, malpositions of the uterus, and the so-called habit of abortion, which is, however, in all probability, itself due to a pre-existing endometritis, or other gynæcological lesion.

Syphilis.—In a case where either parent has been previously the subject of syphilis the administration of a course of mercurial treatment will frequently prevent abortion, and as constant and repeated arrests of pregnancy are the rule with syphilitic patients, even after all other symptoms of the disease have disappeared, this treatment should be perseveringly administered whenever any history of syphilis can be obtained.

Malpositions of the Uterus.—Any marked displacement of the uterus during pregnancy is likely to be accompanied by a congestion so intense as to decidedly increase the tendency to abortion. In any case in which a malposition is discovered during pregnancy it should be at once corrected, and the uterus retained in position by the adjustment of a suitable pessary; but though the proper and guarded use of pessaries at this time is unattended by any marked risk, it is always necessary to inspect them frequently, in order to avoid setting up an irritation of the vagina, which might be sufficient to induce abortion; and it is also proper to remove them early in the fourth month, since by that time the increased size of the uterus renders the recurrence of the displacement unlikely.

Habitual Abortion.—The use of the term "habitual abortion" is, in fact, a confession of ignorance, since the habit is, undoubtedly, always dependent upon the presence of some slight local variations from the normal condition. If such a patient comes under observation when in the non-pregnant condition, every effort should be used to detect and correct any pelvic abnormalities which may be present; malpositions should be rectified, and pelvic exudates subjected to appropriate treatment; but the most common and most easily overlooked causes are the lesser degrees of endometritis, and excessive congestions of the uterus and other pelvic organs. Endometritis may be detected by the discovery of slight enlargement and increased tenderness of the uterus, accompanied by increased uterine secretions, by a slightly patulous condition of the internal os, and by the fact that the most gentle use of the sound excites bleeding. In case of doubt, if a dry tampon be placed over the external os, sustained in position by light packing, and removed at the end of twenty-four hours, the existence of an endometritis may often be determined by examination of the secretion found on the cotton. If endometritis is present, gentle scraping of the whole of the intrauterine surface by a dull wire curette, followed by the use of large douches of hot water in the recumbent position will ordinarily result in a cure. Where intense pelvic congestion exists, and abortions succeed each other with much rapidity, mere abstinence from connection for a period of from three to six months may be sufficient to upset the tendency to miscarriage, but if not a course of pelvic depletion must be entered upon.

When a patient who has had repeated miscarriages applies for treatment, already pregnant, all that can be done is to enjoin the most extreme precautions against the ordinary exciting causes.

In addition to the ordinary precautions, coitus should be forbidden, and the patient should be urged to remain absolutely in bed during that week of each month in which menstruation would naturally have occurred; and if most of the previous abortions have taken place at a given period of pregnancy the same absolute quiet should be advised for some weeks at about that time; it being a fact that if the patient can be tided over the habitual time of abortion, she is not unlikely to go on to term.

EXCITING CAUSES OF ABORTION.—Among the immediate causes of abortion which all patients should be especially cautioned to avoid, are the straining caused by excessive constipation, by an attempt to vomit,[1] or by violent coughing, and the jar of a misstep, a jump, or fall, or of a long railroad journey.

It is frequently caused by lifting unduly heavy weights, occasionally by blows upon the abdomen, and often by an attempt to place some light object upon a high shelf or hook. A pregnant woman should always be cautioned not to hang up her own dresses, to avoid lifting her children, if she have them, and to guard against allowing them to strike or kick her in the abdomen during play or fits of ill-temper. Long railroad journeys should be avoided, if possible, and especially at the periods when menstruation would naturally have occurred. Should it be absolutely necessary for the patient to take such a journey, she should remain throughout it in a recumbent position. The patient should always be told, moreover, that if she becomes conscious at any time of pain in the back, she must at once lie down, and remain quiet till at least an hour after the pain has disappeared, and this, no matter how slight the ache may have been.

THREATENED ABORTION. Uterine pain, or hæmorrhage without pain, always implies some risk of abortion; the appearance of both together, if slight, is no more than severely threatening; if both be present in a moderate degree, the case should be treated in the hope of arresting the threatened miscarriage; but if both pain and hæmorrhage are severe, if the hæmorrhage be excessive, or if with moderate pain and hæmorrhage the cervix be found dilated to an extent which admits the finger, there is ordinarily little hope.

The treatment of threatened abortions resolves itself into the employment of absolute muscular rest, and the free use of opium; but the expression "rest" when used in this connection means complete quietude in bed, without rising for any purpose, during the continuance of the symptoms, and until at least a week after their total disappearance; while opium should be used to the extent of slight narcosis, and should be reduced tentatively, or resumed if the decrease of the dose is followed by a reappearance of the pains or hæmorrhage; though the danger of the formation of a habit must always be borne in mind, in this as in all other instances of the continued use of opium. The effect of opium upon the symptom, hæmorrhage, is of course, indirect and due to its power of arresting uterine contractions.

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[1] It is a peculiar fact that the so-called vomiting of pregnancy rarely results in abortion, although such an accident not infrequently follows severe vomiting due to accidental gastric disturbances.

All mechanical irritation of the cervix should be avoided; and the bowels should be kept open, or at least any extreme accumulation of fæcal matter should be avoided by the constant use of enemata.

INEVITABLE ABORTION.—The two dangers which attend abortion are septicæmia, and exhaustion from hæmorrhage; hæmorrhage during abortion is never profuse, but if unchecked may continue until it produces profound exhaustion. Sepsis rarely originates, and hæmorrhage never continues after a complete evacuation of the uterus, so that both dangers are increased by a long continuance of the process of abortion; and for this reason, so soon as the increased symptoms convince the attendant that the termination of pregnancy has become inevitable, his plan of treatment should undergo a radical change. All the expedients intended to prevent the occurrence of abortion should be discontinued, and all his efforts should be directed toward promoting its progress.

The measures which should be adopted divide themselves into those which are intended to promote expulsion by natural means; and those which are directed to the operative removal of the ovum; the first class comprises the use of ergot, and the vaginal tampon, the second, the removal of the ovum by the finger or by the curette; and the choice between these two classes of treatment depends mainly upon the condition of the ovum; that is, whether the membranes are intact or already ruptured. The expulsion of an intact ovum is much the more favorable event, because hæmorrhage in such cases is rarely severe, for the reason that any effusion of blood behind the ovum drives this down against the internal os, where it forms a ball valve, and prevents any further loss of blood, so soon as the uterine cavity is filled; after which the contractions of the uterus against the contained mass of blood and ovum tend to dilate the cervix as in natural labor; but so soon as the membranes rupture, the decreased size of the ovum renders it no longer capable of maintaining this valve-like action, the effused blood begins to escape between the ovum and the cervix, and may continue to flow until the constant, though moderate loss of blood has seriously weakened the patient. One exception to this statement must, however, be noted, in case the decidua is so completely detached from the uterine walls as to permit descent of the whole remaining portion of the ovum into the cervix, this may still be sufficiently large to restrain the effused blood and to permit the occurrence of spontaneous delivery—a state of affairs which is to be surmised from the non-appearance of hæmorrhage and the persistence of pains, after the escape of the fœtus.

On assuming the charge of a case of inevitable abortion, the physician's first duty is to collect and examine all the clots which have been passed, so far as they can be obtained; and as the ovum or fœtus is usually enveloped in blood when voided, it is necessary to tear apart, under water and with the utmost carefulness, all clots of any considerable size before assuming its absence. If after this examination no portion of the ovum is found, or if on vaginal examination the smooth elastic surface of the intact membranes is felt within the cervix, the use of any form of manipulation which could possibly rupture the decidua should be avoided, and the treatment confined to the use of ergot and the tampon.

Ergot during the first three months of pregnancy has an effect closely similar to that which it exerts on the non-pregnant uterus, and in moderate, continued doses distinctly promotes expulsion; but after the end of the third month it is less reliable; of account of its tendency to produce a tonic constriction of the then more developed cervix.

The Tampon, if properly applied, is perhaps the best and most efficient means at our command for the treatment of abortion, so long as the ovum completely fills the cervix. For this purpose, the application of a small tampon through the cylindrical or bivalve speculum, with the patient upon her back, is totally inefficient; to secure the best results, the patient must be placed in the left latero-prone position, and the perinæum retracted by a Sims' speculum; the vagina should then be carefully swabbed out, under the guidance of the eye, with a one to twenty carbolic acid or a one to sixty creolin solution, care being taken to omit no portion of the vaginal walls or cervix; and a number of small plugs of cotton, strips of gauze, or pieces of lamp wicking, should be wrung out of the same solution, and packed around the cervix one after another, with a pair of uterine dressing forceps, until the fornix of the vagina is thoroughly distended; the speculum should then be slightly withdrawn, and the lower portion of the vagina packed in the same manner; a degree of distention being obtained which just avoids the production of severe pain or discomfort.

The tampon should not be left *in situ* more than twelve hours, at the end of which time it should be removed by the physician (preferably with the patient in Sims' position), piece by piece, under the guidance of the eye. In many cases the ovum and clots will be found already in the vagina, behind the tampon; but if this has not occurred and the patient's condition is not such as to afford any indication for hurry, another tampon should be introduced, to be removed in its turn at the expiration of an equal number of hours; this process should be repeated until the desired end has been attained, or until the patient begins to show signs of exhaustion which call for more radical measures; and the action of the tampon may, with advantage, be reinforced by the administration of ergot, if the pains are weak.

After rupture of the ovum it is proper to administer ergot, or introduce a tampon, and wait a few hours in the hope that spontaneous expulsion may still occur, provided that the hemorrhage is not excessive; but if at the end of this time no progress has been made, or if hæmorrhage is still going on, the physician should not wait for the appearance of exhaustion, but should at once apply himself to the immediate removal of the remains of the ovum. This may be done with the finger or by a dull curette, and it may be said that here, as elsewhere in obstetrics, the sentient finger is ordinarily a better tool than any rigid instrument, but in this case the choice of methods must depend mainly upon the degree of dilatation present; if the cervix is so far patulous that the finger can be passed into the uterine cavity without undue force, this is by far the better method; but if the canal of the cervix is too small to admit the finger the curette must be employed instead.

Removal by the Finger.—If the patient is not extremely sensitive, and rough or abrupt movements be avoided, it is usually possible, with the woman in the lithotomy position, to so far depress the uterus by palpation through the abdominal walls as to enable the finger of the other hand to be passed through the os and up to the fundus without the use of ether. When this has been done, the attempt to extract the ovum should be delayed until the tip of the finger has been made to pass up along one lateral wall of the uterus to the fundus, and entirely above the ovum; it should then be made to pass gently across the fundus to the opening of the other Fallopian tube, and swept downward along the corresponding lateral wall, driving the clots and retained membranes into the vagina in the process; but if, during this manipulation, the decidua escape from under the finger and slip back to the fundus, it must again be carried above them before their removal is attempted.

Removal by the Curette.—The use of the finger is less difficult to the inexperienced than that of the curette, but in cases where the cervix is not sufficiently dilated to permit the easy introduction of the finger, the smaller size of the curette makes it the better instrument. It may be used through the bivalve speculum, and with the patient upon her back, but an operator who is familiar with the use of Sims' speculum will prefer the semi-prone position on account of the greater freedom of motion which it permits to the curette. The patient being in position, a medium-sized Thomas' dull wire curette should be passed gently through the cervix, and made to traverse all portions of the uterine wall, the complete removal of the decidua being recognized by the sensation of grating which the firm uterine tissue gives to the hand, during the use of the curette.

Whichever method has been adopted should be followed by flushing out the uterine cavity through a Bozeman or other double-current, intra-uterine catheter, with a 1:4,000 solution of corrosive sublimate at a temperature of from 100° to 110° F.; and this should be succeeded by a small intra-uterine douche of boiled water which has been reduced to the same temperature. These, like all intra-uterine injections, should be given under the guidance of the eye, and a careful watch should be kept to see that the return current is constantly maintained, as any neglect of this precaution may result in forcing a portion of the injection into the Fallopian tube, and in thus setting up a salpingitis or pelvic peritonitis.

FIBRINOUS MOLE.—Any small portion of the decidua which may be left within the uterus ordinarily disintegrates and causes no trouble, if full antiseptic precautions have been observed; it occasionally happens, however, that such retained portions may obtain sufficient nourishment to remain alive, and may then develop into a polypus-like mass which is known by the name of a fibrinous mole (Fig. 4). The formation of such a growth is marked by fresh or increased hæmorrhage, and the only proper treatment consists in its removal by the finger or curette in the manner already described.

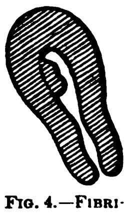
FIG. 4.—FIBRINOUS MOLE.

NEGLECTED ABORTION.—When either abortion or miscarriage has been allowed to proceed without treatment to a point at which the patient is greatly exhausted by hæmorrhage, or till sepsis has distinctly set in, it was formerly the custom to counsel delay until efforts to improve the patient's general condition had been successful, in the fear that local treatment might induce collapse or an increase of inflammation—an accident which in the patient's exhausted condition might hasten a fatal termination. The more modern view is, that the immediate, gentle, and thoroughly aseptic use of the curette, if followed by the administration of a careful intra-uterine douche, is almost invariably the best treatment, and this is the only course which can now be recommended. It is certainly injudicious to resort to general sustaining measures in the treatment of collapse from hæmorrhage while the bleeding is still going on, and it is rarely possible to prevent still further loss of blood in such cases until after the complete evacuation of the uterus; while an arrest of septic absorption can hardly be hoped for as long as the original source of infection remains in place—theoretical considerations which are sustained by the fact that practical experience proves that the operation is attended by but slight exhaustion and that sepsis in particular is usually found to decrease rapidly after the removal of the ovum, provided that the most rigid antisepsis is employed throughout the operation. If in such cases a temporary improvement is followed by recurrence of the trouble, a prompt repetition of the operation is always advisable.

Lochia of Abortion.—A slight lochial discharge usually persists for about three times as many days as the gestation has lasted months.

Miscarriage.

The management of miscarriage differs but little from that of abortion except in the following particulars. After the formation of the placenta the discharge of an intact ovum is comparatively rare. The birth of the fœtus differs from delivery at term only in the fact that the dilatation of the cervix is apt to be slow and tedious; but this may in itself be sufficient to result in undue prolongation or even in an arrest of labor, and may necessitate a manual dilatation. In breech presentations, which are extremely common in miscarriage, the after-coming head is usually arrested by a constriction of the os around the neck of the fœtus, which must then be delivered by traction upon the lower extremities, but in this process great care should be taken to avoid laceration of the cervix. In the great majority of cases, the placenta is retained and requires manual removal; and in miscarriage, unless during the fourth month, the use of the finger is preferable to that of the curette, for the reasons already given, and because in a great majority of cases the os is freely patent.

Premature Labor.

Premature labor differs in no way from labor at term, and should only be expedited in the presence of some one of the usual obstetric indications.

MALPOSITIONS AND ABNORMALITIES OF THE UTERUS.

PROLAPSE.—Prolapse of the uterus is rarely initiated during gestation, but since uncomplicated prolapse offers no obstacle to conception, the minor degrees of this condition are not infrequently observed in co-existence with pregnancy. When the pelvic space becomes insufficient for the increased size of the uterus, its ascent into the abdomen, which occurs about the end of the third month, usually puts an end to prolapse, but this malposition produces so distinct a tendency to abortion that the pregnancy is not infrequently terminated before this natural relief occurs. It is consequently important to relieve prolapse by the adjustment of a suitable pessary, whenever the lesion is observed in any considerable degree during the early months of pregnancy, since the presence of a pessary is less likely to result in abortion than is the persistence of a displacement which has already produced sufficient discomfort to lead the patient to seek advice, but the exertion of the utmost care to prevent irritation of the vagina by the pessary is here of even more importance than under ordinary circumstances; to which end it is impórtant that the patient should be examined at intervals of from two to three weeks. At each visit the physician should make a careful determination of the relations between the pessary and the vaginal walls and uterus, in order to alter its shape or size from time to time, as the increased size of the fundus may require. The use of too large a pessary cannot be too carefully avoided, as any ulceration of the vaginal walls or even undue pressure upon the uterine body may readily be followed by abortion. Preference should be given to soft and elastic, rather than to rigid instruments; the Meig's elastic ring, and that variety of the Hodge pessary which is sold under the trade-name of "patent process," being the preferable forms.

Incarceration.—In prolapse of the second degree, where treatment has been neglected and abortion does not occur, incarceration of the gravid uterus within the pelvic cavity may exceptionally be produced. This accident not only exposes the patient to certain miscarriage, but also involves some danger of sloughing and gangrene of the pelvic contents from the pressure due to the increased size of the uterus. If this rare condition is found to exist, it is, therefore, always a sufficient indication for immediate abortion, provided that all attempts at elevation of the uterus fail. Such attempts, to be efficient, should be conducted with the patient in the knee-chest position, and by the introduction of the half or whole hand into the vagina, if necessary under anæsthesia.

ANTEVERSION.—Anteversion in degree sufficient to cause symptoms rarely exists, and is then usually relieved spontaneously in the progress of time. When such a displacement is the cause of annoying frequency or pain in urination, relief may frequently be obtained by recommending the patient to pass as much time as possible in the recumbent position and upon the back, but in any case where the distress is sufficiently extreme to demand immediate relief, this may usually be obtained by the introduction of a suitable pessary, such as is ordinarily used in anteversion of the non-gravid uterus.

RETROVERSION AND RETROFLEXION.—Backward displacements are by far the most common malpositions of the pregnant uterus, and are also by far the most troublesome; giving rise to many reflex troubles, as, for instance, the extreme degrees of nausea and vomiting; and moreover exposing the patient to no small danger of incarceration. When either of these displacements is due to the existence of firm adhesions between the fundus uteri and the posterior wall of the pelvis, abortion is almost certain to follow; when they are uncomplicated by such adhesions, treatment during the early months is easy and effects prompt relief. It should consist in the reposition of the displaced organ, and its retention in place by a Hodge or other suitable pessary, the form known as the "patent process" being again preferred.

Incarceration.—If retroversion of the pregnant uterus be allowed to continue without treatment, the natural increase of the organ may effect spontaneous reduction of the displacement, but is more likely to result in the incarceration of the enlarged fundus beneath the promontory of the sacrum—an accident which, as time progresses, necessarily leads to a progressive increase of the displacement, until, in extreme cases, the fundus is found to have depressed the posterior vaginal wall almost to the perinæum, while the cervix points almost directly upward. The amount of sacral pain and vesical distress which the traction of such extreme displacements necessarily causes can easily be imagined.

Treatment.—In simple cases it is sometimes possible to effect reposition by pressure in the posterior cul-de-sac with two or more fingers of the examining hand, and with the patient in the lithotomy position; but if this attempt fails, as is usually the case, the patient must be placed in the left latero-prone, or better in the knee-chest position. In this attitude, if the abdomen is left thoroughly free by the removal of all pressure of the clothing, retraction of the perinæum, with the consequent entrance of air into the vagina, may effect replacement by the influence of gravity alone; to which end the patient should be instructed to make a number of forced respirations, while the physician retracts the perinæum with the speculum, and watches the motions of the cervix. This effort failing, two fingers of the left hand should be introduced into the rectum, and should make pressure upward and forward upon the fundus of the uterus, while the thumb of the same hand, or the forefinger of the other, is introduced into the vagina and attempts to hook the cervix down, the fundus being allowed to pass to that side of the promontory to which it seems naturally to incline.

If, as is common, incarceration uncomplicated by adhesions has been attended by the production of extreme œdema and congestion, the reposition of the uterus should be preceded by an attempt to relieve the swelling due to this cause by means of the persistent use, if necessary for many days, of a glycerin tampon in the vagina. This tampon should be small, should be soaked in a mixture of equal parts of glycerin and water, must be renewed at least twice in twenty-four hours, and should be kept continuously in position. After the reduction of the swelling, or if, after several days' use of the tampon, no effect is perceptible, a prolonged and persistent attempt at reposition should be made under ether by the method already described. Should this attempt fail, it may be justifiable to make an effort toward reducing the size of the uterus by the use of prolonged hot-water douches, or even local scarification, to be succeeded, if successful, by a further attempt at reposition before proceeding to the induction of labor, which is always indicated in case of a final failure to reduce the incarceration, but which may sometimes be far from easy on account of the position of the cervix.

If the case is complicated by the presence of adhesions, or if in uncomplicated cases persistent efforts by the preceding methods fail to effect the ascent of the fundus, it may be regarded as certain that the situation is such that, in view of the serious dangers of incarceration, an abortion is to be hoped for rather than feared, and that a far more heroic method of treatment must therefore be adopted; and it is generally best in such cases to proceed at once to the use of a systematic tamponade of the vagina, introduced through the Sims' speculum in the manner described by all text-books on gynæcology for the relief of retroversion. This procedure will frequently be followed by miscarriage, but may occasionally result in replacement without disturbance of pregnancy; in view, however, of the probability of its resulting in the production of abortion, it should never be adopted without consultation with another physician, and then only after explaining to the family the circumstances of the case.

If even this attempt fails, the induction of labor is indicated, but owing to the position of the cervix its performance may be a matter of considerable difficulty. If the os be within reach of the finger, digital dilatation and rupture of the membranes offers the most effective and ready treatment, but if the position of the cervix makes this impossible, the object may sometimes be effected by the use of the following mechanical device. The end of a small metal catheter should be cut off, and the last inch of the remainder bent sharply upon itself; the instrument may then be passed along the anterior surface of the cervix, under the guidance of the finger, until its end can be hooked into the uplooking external os, and if this position be once attained, a flexible strip of whalebone or a soft probe may be passed through the catheter, and following its curve, may be made to enter the uterine cavity and effect rupture of the membranes. In case of failure by all other means, aspiration of the liquor amnii through the vaginal wall may be attempted, under the most strict of antiseptic precautions, but this operation is not devoid of danger, and fortunately is rarely necessary.

Abnormalities of the Sexual Organs.

Since the uterus and vagina are both produced by the coalescence of Müller's ducts, which in the early stages of development are double and bilaterally symmetrical, an arrest of their development may result in the persistence of a median septum in any portion of the uterus or vagina or even throughout the whole parturient canal; thus we may have a double uterine cavity with a single cervix, a double cervix with a single body, or even a complete duplication of the uterus; and any one of these deformities may exist in conjunction with a single or double vagina. Some of these malformations are of practical importance at the time of labor, but as they are rarely discovered during pregnancy and are of no importance at that time, no further description is deemed necessary here.

HERNIA.—Hernia of the uterus is rare under any circumstances, and hernia of the gravid uterus is of still more infrequent occurrence. Should it be found to exist, it is always a sufficient reason for the immediate induction of labor, unless the displacement can be easily reduced by taxis.

SURGICAL OPERATIONS.

Unnecessary surgical operations are to be avoided during pregnancy, because possibly productive of abortion, but minor operations upon tissues unconnected with the reproductive system are rarely followed by this accident, and may be performed if sufficient indications exist. Operations upon the genital tract, including operations upon the breasts, are followed by abortion in the large majority of cases, and this although the extent of the wound may be slight; such operations should, therefore.

never be performed unless in the presence of imperative necessity, either on account of the existence of serious risk to the life of the mother if the operation be deferred, or because the presence of a new growth or other pathological condition offers an insuperable obstacle to delivery.

Cancer of the Cervix.—Cancer of the cervix is likely to increase rapidly during pregnancy, and if at all extensive is best removed by the curette or by amputation of the cervix so soon as the child has reached the period of viability, on account of the serious and even fatal hæmorrhage which may follow upon the laceration of such tissues during parturition.

Ovarian Cysts.—Intra-pelvic ovarian tumors may frequently be raised into the abdomen by a proper taxis, and if this be possible should be left undisturbed until after the termination of pregnancy, unless their growth is sufficiently rapid to threaten miscarriage *per se;* but if this is the case, the immediate performance of laparatomy is justified by the number of cases, now considerable, in which such an operation has failed to interfere with pregnancy, and in view of the liability to miscarriage without operation.

Trauma.—The results of accidents bear about the same relation to pregnancy as those outlined above for surgical operations; the chance of miscarriage being proportional to the extent of the injury, and to its anatomical proximity to the pregnant uterus. In the after-treatment of operations, and in the treatment of accidents among pregnant women, absolute restriction to the recumbent position and a free use of opiates are to be especially enjoined.

Both accidents and surgical operations are less well borne at the periods when the catamenia would naturally have occurred than at other times, and are especially likely to be followed by miscarriage at the third or seventh month. If a surgical operation is indicated during pregnancy, it should always, if possible, be deferred until the period of viability is reached.

DISEASES OF THE OVUM.

Endometritis.—This disease rarely originates during pregnancy, but the continuance of a pre-existent intra-uterine inflammation is thought to be a frequent cause of blighted ovum and adherent placenta. It can rarely be diagnosticated during pregnancy, but is said to be accompanied by undue sensitiveness to the movements of the child.

The catarrhal form of endometritis is supposed to be the cause of the affection known as hydrorrhœa gravidarum. The existence of this disease is signalized by the discharge at varying intervals, during the middle or later months of pregnancy, of a thin albuminous fluid, in quantities which vary from a drachm to several ounces; discharges which are unaccompanied by pain, and never followed by miscarriage. The affection is of no pathological importance, and no treatment is indicated.

HYDRAMNION.—The condition known as hydramnion is essentially the presence of an abnormal amount of liquor amnii, and has been accounted for by many different theories, about which considerable difference of opinion still prevails. It is not infrequently coexistent with fœtal monstrosity.

The discomfort due to it must be endured until the mother's existence is actually threatened by an embarrassment, or partial arrest; of circulation or respiration as a result of distention. It may then be treated by puncture of the membranes, or by an aspiration of the uterus through the abdominal walls. This latter operation, if done with sufficient care and with absolute asepsis, should be ordinarily attended by no danger; and is usually the better treatment, since it may be followed by a continuance of pregnancy to term. The puncture should be made at that spot at which it seems least likely to injure the fœtus—a point which can usually be determined by careful palpation; and the withdrawal of liquor should be stopped as soon as the distention is definitely relieved, in order to minimize the risk of exciting labor.

DEATH OF THE FŒTUS.—Death of the fœtus may result from any general disease of sufficient severity. When it results from acute illness it is usually succeeded by prompt abortion, but a fœtus which dies a slow death from chronic affections is often retained in utero for a considerable length of time, and may even be carried to full term. It is sometimes important to be able to diagnosticate the occurrence of fœtal death, which is usually accompanied by more or less marked symptoms.

Pregnant women are frequently alarmed by a disappearance of the fœtal movements, which is due to some change in the position of the child that makes them imperceptible to the mother for a period of a few hours or days. This intermission of the movements is by itself of no importance, but possesses some significance when it occurs in connection with other symptoms. Cessation of movement due to the death of the child is often preceded by an increase of movement, probably of convulsive origin.

Death of the child is frequently followed by swelling and turgescence of the breasts, accompanied in some cases by the appearance of milk, and followed by a marked decrease in their size. The patient frequently complains of malaise, fatigue, and general lassitude, and sometimes of a sensation of weight and coldness in the abdomen. If the heart-sounds have been previously heard, their continued absence is highly suggestive, but it must be remembered that they, like the fœtal movements, are normally subject to apparent disappearances for short periods.

When death occurs, an embryo of not more than two months' development is often wholly absorbed, but after that period, absorption is rare, and maceration is the rule. Maceration is an aseptic decomposition, and the macerated tissues rapidly become so soft and flabby that the fœtus when laid upon a level surface assumes a flattened form under the influence of gravity, in the same manner that would be observed in a bag partly filled with fluid. The epidermis is loosened and peels off at the lightest touch. The fœtus emits a stale, sickly sweet odor, easily distinguished from the odor of putridity.

The presence in utero of a macerated fœtus never causes septic absorption; if, however, air be admitted to the surface of the membranes, or the germs of ordinary decomposition be brought into contact with them in any way, true putrefaction rapidly comes on, and under these circumstances, or when a previously macerated fœtus is exposed to the air after delivery, the foul gases of decomposition are rapidly evolved, the body swells, a green color appears, and the characteristic odor is shortly perceptible. Should such decomposition occur in utero, absorption of septic poison by the mother is by no means unlikely.

PART II.—NORMAL LABOR.

CHAPTER VI.

CLASSIFICATION OF LABOR. DIAGNOSIS OF PRESENTATION AND POSITION.

Classification of Labor.

For purposes of description it is usual to arrange labor cases under the head of presentations; that is, in accordance with the relations which the long axis of the child bears to the long axis of the uterus, whether situated parallel to it or at an angle; and, further, in longitudinal presentations as the cephalic or pelvic end of the child presents at the inlet of the pelvis.

The presentations of the head, or cephalic extremity, are the vertex, brow, and face; pelvic presentations are subdivided into breech and footling; transverse into presentations of the trunk and shoulder. Shoulder presentations are again subdivided into presentations of the shoulder proper, presentations of the elbow and of the hand.

Labor is also divided in two other ways, according to the results which may be expected to accrue from the presentation, into normal and abnormal, natural and unnatural, labor. Normal labor includes presentations of the vertex, and of the vertex only, all others being considered abnormal; and this on account, not only of the more favorable prognosis which attends on vertex presentations, but because of their relatively great frequency. Those labors in which the delivery is effected by the natural expulsive efforts of the uterus are classified as natural labors; those in which nature fails, and the delivery is effected by obstetric art, being termed unnatural labors.

Each presentation has, further, several varieties known as positions, and named in accordance with the relation between some prominent point upon that portion of the fœtus which presents and the various parts of the pelvic wall; thus the different positions in presentations of the vertex are named in accordance with the position of the occiput in relation to the pelvis; *e.g.*, occiput left anterior (O. L. A.), when the centre of the occipital bone is found to be in the left anterior quadrant of the canal; in brow presentations the forehead, *i.e.*, the region of the root of the nose, is taken as the leading point: *e.g.*, brow left anterior, brow right posterior, etc.; in face presentations the chin; *e.g.*; mentum left anterior (M. L. A.), etc.; presentations of the pelvic extremity take their name from the position of the sacrum; sacrum right anterior (S. D. A.), etc.; transverse presentations from that of the scapula; (Sc. L. A.), etc.[1] The importance of the study of position is far too generally underrated, but it may be accepted as an axiom that no man is capable of doing accurate and intelligent obstetrics who is not habitually careful to make a diagnosis of position at the earliest possible moment, in all cases which come under his care.

In vertex, face, and breech presentations, the long diameter of the presenting part occupies that oblique diameter of the pelvis which extends from the left acetabulum to the right sacro-iliac synchondrosis in the great majority of cases; a fact which has been explained as due to the encroachment of the rectum on the other oblique diameter, and in various other ways.

About seventy per cent of all cases of vertex presentation are in the left anterior position (O. L. A.), and the majority of the remainder are O. D. P., but it is impossible to make an exact statement of the relative frequency of O. D. P. and O. D. A., for the reason that all O. D. P. positions in which normal rotation takes place, pass through the stage of O. D. A. It is a fact, however, that primary O. D. A. is a comparatively rare position, and that O. L. P. is so rare as to be an obstetrical curiosity.

Similarly in face presentations the vast majority of all cases are embraced under the heads of M. L. A. and M. L. P.

In pelvic presentations the long diameter of the presenting part is at right angles to that which terminates in the sacrum, the point after which the positions are named, and in consequence the common varieties are S. D. A. and S. L. P.

Transverse presentations are divided into four positions, in accordance with the anterior or posterior situation of the child's back, and with the situation of its head to the right or left of the mother. For the sake of conformity to the nomenclature of the other presentations, these four positions are named after the position of the scapula; that is, with the back anterior and the head to the mother's left, the position is scapula left anterior (Sc. L. A.), with the back posterior, and the head to the mother's left, scapula left posterior (Sc. L. P.). As will be seen under the head of management of transverse presentations, this division of them into positions, though somewhat arbitrary, is of considerable practical importance. The study of the action and interaction of the mechanical relations which govern the passage of the child through the pelvis in a given presentation, lies at the foundation of all scientific and exact obstetrics, and the possession of skill as an obstetric operator always, and necessarily, presupposes an accurate and practical knowledge of the whole subject of mechanism; but interesting and imporant as this matter may be, it is one which belongs rather to more extended text-books upon the theory and practice of midwifery, than to a concise and purely practical manual like the present, and although it is impossible in many instances to write intelligibly upon treatment without mentioning mechanism, it will be necessary to be content here with a simple description of what happens in each variety of labor, without attempting any extended explanation of its occurrence.

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[1] The nomenclature adopted is that recommended by the committee on obstetrical nomenclature of the last International Medical Congress.

Diagnosis of Presentations and Positions.

To this end we are furnished with two methods of examination of almost equal importance, examination of the abdomen, and by the vagina, which must be described separately.

ABDOMINAL INSPECTION, PALPATION, AND AUSCULTATION.

The abdominal examination must be again subdivided into inspection, palpation, and auscultation. In the use of this method of examination, it is best for the beginner to ignore the possibility of O. L. P. and O. D. A. on account of their great infrequency, and of the excessive complications that an effort at their recognition would involve.

The value which the individual obstetrician places upon an abdominal examination is generally proportionate to the experience which he has enjoyed, and the beginner should be urged to avail himself of every opportunity for practising the method, for, while he will find in his early practice many cases in which the obesity of the patient or the rigidity of the abdominal muscles and uterus renders abdominal palpation of no value, a large number in which the examination is inconclusive, and only a few in which he can attain a clear diagnosis by this means, yet as his experience enlarges, the first class will steadily decrease in numbers, and the two latter will increase proportionally, if he is faithful in practising palpation upon every case which comes under his charge; and the value which attaches to facility in making diagnoses by this means in many difficult operative cases, can only be appreciated by those who possess it. It is certainly a fact that to the experienced hand abdominal palpation yields results fully as valuable as those which can be obtained by digital examination per vaginam, and that there are but few cases in which repeated examinations during the progress of labor fail to establish a diagnosis by palpation and auscultation alone.

Inspection.

Inspection is mainly valuable as affording a hint of the existence of transverse presentations and of multiple pregnancy.

Palpation.

Palpation is the most important part of the abdominal examination; it should be performed only in the intervals between the pains, all pressure of the hand being intermitted with the appearance of each contraction. The physician should stand by the patient's side facing toward her feet, and should apply the palm of each hand flat against the corresponding side of the uterus. Throughout the examination it is all important that the motions of the hand should be slow and gentle, any quick or jerky impulse being almost certain to result in rigidity of the abdominal walls and uterus, and thus frustrate the purpose of the examination. Every effort should be made to divert the attention of the patient, to soothe her fears, and to assure her that the examination will not be painful; and it not infrequently happens that the first attempt may be a total failure, while the second will yield satisfactory results, owing to the changed mental condition of the patient.

The finger tips of each hand should be pressed with a gradual and gentle motion downward behind the symphysis pubis in search of the fœtal head, which in cephalic presentations is almost always to be felt in this situation as a marked transverse check to the examining hand, and the fundus should then be carefully palpated as a further means of excluding the possibility of a breech presentation. The head may be distinguished from the breech at the fundus by its greater size and mobility, by its rounded contour as opposed to the tapering form of the smaller pelvis, and by an easily-distinguished sulcus which corresponds to the neck of the child; but the best evidence of the presence of the breech at the fundus is always the recognition of a head presentation by deep palpation behind the symphysis, in which examination care should be taken to note on which side the head is most plainly perceived, since with a well-fixed head the frontal extremity is much the more easily reached, with the extended head but little difference is to be noticed, and in face presentations the occiput is much the most distinct.

In transverse presentations the differential diagnosis between the head and breech is always of importance, and is to be made by the signs enumerated above.

The hands should then be placed along the sides of the uterus and should make gentle but deep pressure toward each other, *i.e.*, with the uterus and child directly between their palms, in the effort to estimate the relative resistance afforded by the right and left sides of the uterus, the flat, firm back of the child usually presenting a resistance to pressure which is markedly greater than that of the yielding abdomen, and movable limbs.

The differing resistances having been estimated, the fingers should be applied to the sides of the uterus, not with the tips deeply indented into the abdomen but with their whole palmar surface pressed firmly against the uterus; the hands should then be moved gently up and down along the uterine wall in the endeavor to recognize the irregularities due to the presence of the fœtal limbs, but during this search it is necessary to guard against the error of mistaking either of the round ligaments for the fœtal members. These ligaments are at term of nearly the size of the adult finger, and extend obliquely from the cornua of the uterus, downward, outward, and forward to the pelvic brim; they may be recognized by their situation, and by the pain of which the patient invariably complains when they are rolled about under the fingers. The existence of small sub-peritoneal fibroids is another possible source of error. With thin and flaccid abdominal walls, it is sometimes possible by this method to recognize the fœtal limbs with the utmost distinctness, but in the majority of cases, an irregularity in the contour of the uterus is all that can be hoped for.

Auscultation.

Auscultation of the fœtal heart gives us confirmatory evidence about the presentations and positions,[1] informs us of the condition of the child, and is the most important sign in the recognition of multiple pregnancy. In interpreting the evidence furnished by this sign it must not be forgotten, however, that owing to the fact that sound is better conducted by solids than by liquids, the exact situation of the fœtal heart-sounds corresponds to that portion of the chest which happens at the moment to be in contact with the uterine wall, so that its situation may vary temporarily with the position of the mother, as one or the other shoulder rests against her soft parts, or may be temporarily absent (especially when the patient lies upon her back) owing to the intervention of liquor amnii between the fœtal chest and the physician's ear.

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[1] Owing to the oblique position which the shoulders normally occupy, the dividing line between the right and left position of the heart sounds in this and all longitudinal presentations should be that drawn between the umbilicus and the right anterior superior spine of the ilium rather than the median line of the body.

In vertex presentations the heart is most plainly heard over the back of the child and below the mother's umbilicus;[1] in breech presentations the heart is heard over the back; but its greatest intensity is generally above the mother's umbilicus; while in presentations of the face, it is most readily heard over that portion of the uterus which corresponds to the chest of the child, but is again below the umbilicus. In transverse presentations, the heart is usually plainly audible when the back is anterior, but is often found with difficulty in the posterior varieties, and is of comparatively little value in the diagnosis of position.

The value of auscultation in the recognition of the condition of the fœtus can hardly be overestimated, any fatigue of importance being quickly shown by alteration of the rate and regularity of the heart-sounds. In addition to the fœtal heart-sounds, the so-called uterine or placental souffle is generally heard, as a soft blowing sound, synchronous with the mother's pulse, and of no practical value.

Recapitulation of Signs by Presentations—Vertex.

The head is felt behind the symphysis, the breech is at the fundus, the heart is below the umbilicus, and is heard on one side of the abdomen, while the limbs and the more accessible portion of the head are felt upon the other; the position of the heart corresponds to that of the occiput, and the limbs and head to that of the forehead.

FACE.—The head is felt at the brim, the breech at the fundus; the limbs and heart are found on one side, and the more accessible part of the head on the other. The limbs and heart are upon the side to which the chin is directed, and the more accessible portion of the head upon that which corresponds to the back of the child.

BREECH.—On deep palpation behind the symphysis, the projections of the occiput and face are not found; the presence of the head at the fundus is recognized by its size and rounded shape, and by the existence of the cervical sulcus; the greatest intensity of the heart is above the umbilicus. The position of the heart corresponds to that of the sacrum, the limbs to that of the fœtal symphysis.

TRANSVERSE.—Upon inspection the abdomen is found to be broad, the fundus to be low, broad, and flat in shape; upon palpation the long diameter of the child is plainly transverse, and a large part[1] is felt in each iliac fossa. Whether the position is right or left is known by recognition of the situations of the head and breech. In anterior positions no small parts are ordinarily to be felt, while if the back be posterior, the fœtal members are usually plainly perceptible through the abdominal wall. In this presentation the results of abdominal palpation are of far more value than anything which can be obtained by digital examination per vaginam.

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[1] See note on preceding page.

MULTIPLE PREGNANCY.—If the uterus contain twins this fact may be recognizable at the time of the usual abdominal examination. The size of the uterus is seen to be much larger than is normal, and in some few cases, a depression is perceptible at the fundus in the median line. Upon palpation three large parts are usually to be felt, and if one hand be held applied to one of the large parts, while the other hand attempts to move the remaining two, first in one direction and then in another, it is frequently possible to establish the fact that two of the three are connected together, while the third is unaffected, or at most but slightly affected by their motions. It rarely happens that all four large parts are to be perceived, one at least being usually so far posterior as to be out of reach. Upon auscultation, two points of maximum intensity of the fœtal heart-sounds may be perceived, the sounds being less distinct in the space between them. If two observers by simultaneous examination succeed in establishing a difference of rate between the two hearts, the diagnosis of twin pregnancy is conclusively established.

Palpation further offers us extremely valuable evidence of the condition of the uterus, whether it is still in a state of normal relaxation between the pains or is beginning to show evidence of fatigue.[2]

VAGINAL EXAMINATION.

In obstetric work it is usually best to avail one's self of the extra length of the middle finger by employing two fingers for all examinations, except in those cases in which the extremely narrow vulva of a primipara makes the introduction of the second finger painful to the patient. Most American obstetricians prefer to examine the patient when in the left lateral decubitus, but it is well to accustom one's self to examining in all positions, not only in the interests of the patient's comfort and convenience, but because it is often possible, by changing the decubitus, to reach a portion of the child which has before been unattainable.

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[1] The fœtal head and breech are commonly spoken of as large parts, while the fœtal members are known as small parts.

[2] See "Retraction and Constriction Rings." Page 117.

The hand, having been thoroughly disinfected and anointed with the aseptic lubricant, should be introduced under the bedclothes, which should be held up by the other hand in such a way as to protect them from contact with the examining fingers; these should be placed against the genital cleft, and swept gently forward till they perceive the entrance of the vulva and come in contact with the fourchette, carefully avoiding friction against the vestibule and clitoris in the process.

As the examining finger enters the vagina, it should notice, successively, the size of the vulvar orifice, the position of the coccyx, the shape of the sacrum,[1] and the condition of the rectum, whether full or empty. These points having been ascertained, the finger should be passed upward into the posterior fornix, and swept forward over the soft and yielding vault of the vagina in the effort to find the external os, which is usually situated in the median line, and near the centre of the pelvis. In case of failure to find it readily, the field of the pelvis should be systematically quartered by the examining finger, much after the fashion employed by a pointer dog in searching a field for game. If the cervix be not yet taken up, it is recognized as a rounded prominence, on the summit of which is found the orifice of the os, if the patient be a primipara; in multiparæ the lacerated and ragged condition of the cervix frequently makes the external os indistinguishable from an early stage of labor, but the finger may usually, in such cases, be passed into the cervical canal, and will then recognize the presence of the internal os. If the cervix has been wholly taken up, the os is best recognized by passing the finger through it, and into the space between the cervix and the presenting part.[2]

The physician's ability to reach the upper portions of the pelvis is more dependent upon the position in which his hand is held, than upon the length of his fingers. When it is desirable to reach the upper and posterior parts of the pelvis, the hand should be held in the position indicated in Fig. 5, *a*, the perineum being strongly retracted by the pressure of the web between the second and third fingers. When the object sought for lies nearer the anterior wall of the pelvis, the position of the hand should be altered by rotation of the fore-arm, into that represented by Fig. 5, *b*. The space between the second and third fingers is now pressed firmly against the edge of the pubic arch, and the pulp of the finger is directed anteriorly.

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[1] The author strongly recommends the practice of roughly measuring the conjugate diameter, by reaching upward for the promontory of the sacrum, as a routine measure, at the conclusion of the first examination in each case, and believes that many operative difficulties may be avoided by this simple procedure.

[2] Unless this precaution of hooking the finger about the edge of the os be observed, the beginner is liable to mistake a fold of the vaginal wall, or in breech presentations the anus, for the os uteri, both of which mistakes have been made many times by medical students in the presence of the author.

The os having been reached, the finger should note its size, the thickness of its edge, and its consistency, whether hard or soft; and by very gentle stretching should endeavor to ascertain its degree of dilatability; but in this last manœuvre it is necessary to employ the greatest gentleness in order to avoid the inexcusable accident of manual laceration of the os during examination. The characteristically different sensations yielded to the finger by the smooth and velvety cervix, the rough but slippery membranes, and the hairy scalp, is a matter with which it is im-

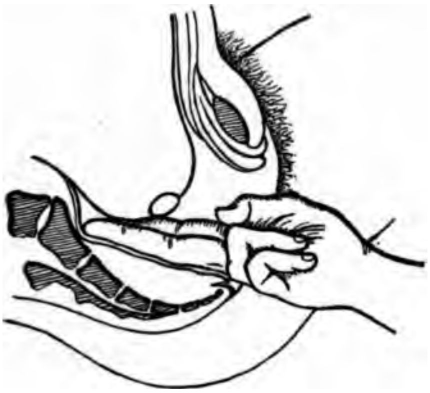

FIG. 5 *a*.—FIRST POSITION OF THE EXAMINING HAND.

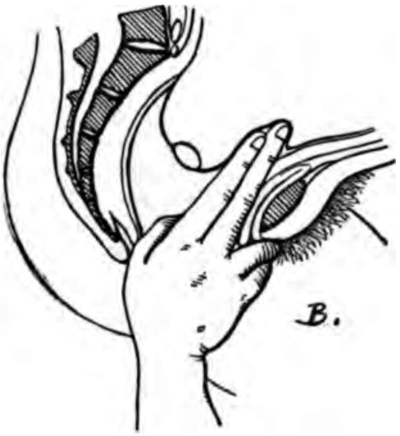

FIG. 5 *b*.—SECOND POSITION OF THE EXAMINING HAND.

portant to become familiar; for it is easy to recognize these differences if the physician has trained himself to observ them in evene a comparatively small number of cases; and the possession of this faculty may preserve him from the dangerous or even fatal error of making an application of the forceps to the intact membranes, or over an undilated cervix.

DIAGONSIS OF PRESENTATION.—The diagnosis of presentation by vaginal examination, though ordinarily easy, is sometimes difficult when the presenting part is still high in the pelvis; it would be supposed, *a priori*, that the distinction between the hard head and the yielding breech could be made in all cases with the greatest ease, but a considerable experience in the superintendence of students has convinced the author that this is a most unsafe and unsatisfactory guide, and some personal experiences have led him to adopt the rule of never permitting himself to diagnose a head unless it is possible to recognize at least one suture, nor to commit himself to the diagnosis of a breech without inserting the examining finger into the anus, and recognizing the presence of the coccyx.

If the cervix be thin, it may be possible to recognize these diagnostic marks through its substance, but in ordinary cases it is necessary to introduce the finger through the os, in order to distinguish between the different parts of the child.

When the two fontanelles are the only distinctive points within reach, the vertex presents.

When the supra-orbital ridges and the bridge of the nose are easily accessible, and the small fontanelle is reached with difficulty, the presentation is that of a brow.

The face is to be recognized by the presence of the small and pointed chin, by the insertion of the finger into mouth, and by perception of the nostrils, the eyes, the root of the nose, and the supra-orbital ridges[1] in their proper positions.

The diagnosis of shoulder presentations is not easily made by vaginal examination during the early stages of labor, but they should always have been recognized by abdominal palpation before the vaginal examination is made.

At the first examination the presence or absence of the caput succedaneum should be noted, and the character and strength of the uterine contractions should be estimated by observing the tension to which the membranes are subjected during the height of the pains and by observation of the comparative length of the pains and intervals.

DIAGNOSIS OF POSITION—VERTEX WELL FLEXED.—With a vertex presentation and a well-flexed head, the examining finger, on passing through the os, ordinarily recognizes, not far from the centre of the field, the convergence of three sutures (Fig. 6, *a*) which forms the posterior fontanelle,[1] the recognition of which offers positive evidence of a vertex presentation with good flexion, but affords no more than a hint of the position which may be present.

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[1] The sub-occipital ridges may easily be mistaken for the supra-orbital, if care is not taken to search for the other points as well.

The lambdoidal sutures ordinarily meet at more of an obtuse angle than is formed by the sagittal and either parietal, the occipital bone is commonly overlapped throughout labor by both parietals, one of which usually overlaps its fellow, and the observance of these two points may furnish to the expert finger evidence of some slight value in determining which of the three bones is the occipital; while the position of the fontanelle as a whole in one or the other quadrant of the pelvis gives another hint of the position which is probably present, but these facts are always in themselves insufficient for any approach to a positive diagnosis.

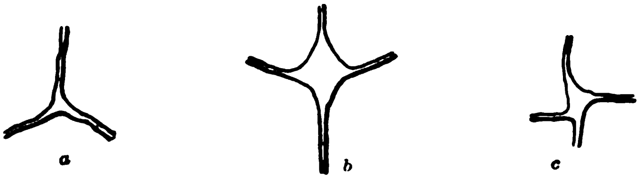

FIG. 6.—DIAGRAMS OF THE FONTANELLES. *a*, The posterior fontanelle; *b*, the anterior fontanelle; *c*, the lateral fontanelle.

Each of the three sutures, however, ends in a distinguishing feature, and a diagnosis is to be reached by following as many sutures as possible to their terminations. The sagittal suture ends in the lozenge-shaped anterior fontanelle from which four sutures emerge at right angles and opposite to each other (Fig. 6, *b*) while each of the lambdoidals terminates in an ear and mastoid process, and in the irregularly-shaped lateral fontanelle. The lateral fontanelle is often ill-marked and is important only because it is sometimes mistaken for the anterior fontanelle; it is formed by four sutures, which go off at right angles but not opposite to each other (Fig. 6, *c*). The mastoid is not always to be recognized with ease, but when well marked is of about the size and shape of an adult canine tooth, and is, of course, always situated upon the occipital side of the ear. The flap of the ear must always point toward the occiput unless, as sometimes happens, it be folded forward against the scalp, a fact which is easily recognized if the finger is passed backward and forward a few times across the ear. Thus, if in addition to the recognition of the posterior fontanelle, any one of the three sutures has been followed to its termination, a fairly satisfactory diagnosis may be made, and if two of them have been so followed the diagnosis is assured; but it is a good rule that no obstetrician should ever permit himself to apply the forceps without having reached at least two, and preferably three, of these diagnostic points.

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[1] It must not be forgotten that during labor the fontanelle exists only in name, being converted, by the crowding together of the cranial bones, into a mere meeting of sutures.

The Extended Head.—In presentations of the extended head, the anterior fontanelle occupies a position in the pelvis which renders it at least as easily accessible as the occipital, and with extreme extension, the eyebrows and the root of the nose are frequently reached. Additional evidence of extension is also furnished by the fact that in these presentations the examining finger, in searching for the ear, touches most easily the anterior, and not the upper edge of the helix, while the ear as a whole is more accessible than the mastoid process. The situation of the occiput, of course, gives the name to the position.

Brow.—The position in brow presentations is named in accordance with the position of the forehead.

Face.—When a presentation of the face has once been detected, the recognition of the position is usually easy, owing to the ease with which the situation of the pointed chin can be localized.

Breech.—The diagnosis of position in breech cases is not always easy, the soft buttocks being often so much compressed and moulded under the forces of labor as to form a very confusing mass, but it should be made by observing the position occupied by the rough sacral spines, and by the scrotum or vulvar cleft, which should of course be found upon the opposite side of the pelvis; the best method of diagnosis is, however, by the introduction of the finger into the rectum of the child, when the recognition of the ischial tuberosities and of the tip of the coccyx is extremely easy, and allows a very accurate localization to be made. The position of the coccyx, of course, corresponds to that of the sacrum, and to the name which is given to the position.

Presentations of the Knee and Elbow.—The knee may sometimes be distinguished from the elbow by the presence of the patella, but since this is small and not always easy of recognition, it is best to distinguish between these two joints by following the course of the limb to its termination in a hand or foot, as the case may be.

Presentation of a Hand or Foot.—If the membranes be ruptured, a presenting hand or foot may easily be drawn outside the vulva and recognized by the eye; if this be impossible it may usually be differentiated by the touch through the membranes by observation of the following points: the foot is to be distinguished from the hand by the presence of the malleoli and of the prominence of the heel, and by the facts that the great toe is of equal or greater length than the others, and is placed in the same plane with them; while the hand is recognized by the absence of the heel, by the fact that it can be placed in direct continuation of the line of the limb to which it is attached, and that the thumb is shorter than the fingers and can be opposed to them. The importance of avoiding rupture of the membranes in such presentations is, however, so great that it is usually best to trust to the results of external palpation.

Transverse.—The shoulder is liable to be mistaken only for the breech, from which it may be distinguished by the presence of but one limb in place of the two which are attached to the pelvis, and by recognition of the smooth ridge of the scapula, as opposed to the rough spines of the sacrum, but the recognition of a shoulder by vaginal examination is extremely difficult, and the existence of the presentation is practically ascertained in the majority of cases by external palpation without assistance from vaginal examination.

In presentations of the hand it is sometimes possible to make a diagnosis of position by observation of the hand alone; to this end it is first necessary to determine which hand of the fœtus presents, which is best ascertained by attempting to shake hands with the presenting part, the right hand of the fœtus coming into position to shake hands with the right hand of the physician, and the left with the left; if then the presenting hand be turned by rotation of the fore-arm into forced supination, the thumb points to the side on which the fœtal head lies and the back of the hand corresponds to the back of the fœtus, but in actual practice the attitude of the child so seldom corresponds exactly to any one of the four classical positions that this evidence is of comparatively slight value, and is only to be used as confirmatory of the results of palpation.

CHAPTER VII.

ANTISEPSIS AND PREPARATIONS FOR LABOR.

IMPORTANCE OF ANTISEPSIS.—The value of antisepsis is of late so generally admitted that it may seem unnecessary to dwell upon its importance in any work of the present day. Yet so large a portion of the profession are still indifferent or careless in this matter that a brief statement of the experience of the past few years is not as yet out of place.

Among the most striking examples of the revolution which has been wrought in the practice of obstetrics by the introduction of antiseptic principles is the experience of Garrigues in the New York Maternity on Blackwell's Island. During the twelve months from October 1st, 1882, to October 1st, 1883, the death-rate from septicæmia in that institution reached a per cent of 6.06, and during the last month of that year, in September, 1883, attained the frightful rate of 15.69% of all the women confined.

On the first of October, Dr. Garrigues introduced the system now in use in most lying-in institutions, and to be described in the latter part of this chapter. During the next three years the total death-rate from septicæmia was as follows:

From October 1st, 1883, to October 1st, 1884, .	.0059
From October 1st, 1884, to October 1st, 1885. .	.0018
From October 1st, 1885, to October 1st, 1886, .	.0021

The excellence of Dr. Garrigues' results under this system led to its adoption by Prof. W. L. Richardson in the Boston Lying-in Hospital. In this institution the death-rate had never been so high as in the New York Maternity, but from January 1st, 1883, to January 1st, 1884, the death-rate from sepsis was 4.58%. Garrigues' system was adopted on the 1st of October, the beginning of Dr. Richardson's service; and from January 1st, 1884, to January 1st, 1885, being the first year in which the method was in operation, the septic death-rate fell to 1.65%.

From January 1st, 1885, to January 1st, 1886, it was .	.0064
" " " 1886, " " " 1887, " . .	.000
" " " 1887, " " " 1888, " . .	.002
" " " 1888, " " " 1889, " . .	.002
" " " 1889, " " " 1890, " . .	.002[1]
" " " 1890, " " " 1891, " . .	.000

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[1] One patient each year.

In addition to the decreased death-rate, Professor Richardson says of the convalescence:[1] "There has been marked freedom from any tenderness over the uterus or its appendages; less complaint has been made of after-pains, and the general range of temperature has been much lower, rarely exceeding 99°."

The charts on pages 84 and 85 show these results in a graphic form.

This and similar experiences in many cities and institutions have led to a wide-spread acceptance of the fact that the use of antiseptic precautions is essential to the administration of a well-conducted lying-in hospital, but the author's experience in consultation practice has given him abundant reason to believe that the mass of the profession still think it unnecessary in private practice, on account of the alleged infrequency of puerperal fever in that field of work.

This allegation may be answered in two ways. First: the experience of life insurance companies[2] shows that of 2,182 insured women, 197 died from puerperal causes (9.03%), and statistical tables indicate that 75% of the deaths during childbed are due to puerperal fever. The fact that these women are of the class who place insurance on their lives, makes it unlikely that any considerable proportion of them were hospital patients; and it is indeed probable that most of these deaths occurred among the better classes of society, and in the practice of at least fairly competent physicians. Secondly: an all important point that is generally lost sight of is the fact that the death-rate from septicæmia is only one of its many and far-reaching results. When the profession has learned that for every death from septic absorption, we may reckon large numbers of cases of mild sepsis, the majority of which wreck the after-health of their victims; when the general practitioner has been taught to know that the income of the gynæcologist is largely dependent upon the dirty finger-nail of the obstetrician, and that the chronic ill-health of many of his own patients is dependent upon his personal carelessness while in attendance upon their past labors, we shall hear less often the boast that Dr. So-and-so during his large experience has never seen a case of septicæmia, in spite of his neglect of antiseptic precautions—a remark which is to-day practically equivalent to the statement that that physician is unable to recognize the presence of mild sepsis. Few men who have not been specially trained in this particular line realize how largely the milder complications of the puerperal state are dependent upon imperfect antisepsis, and how uniformly its stringent observance is followed by a rapid and uncomplicated convalescence; while even among those who have grown to believe in the great importance of a strict use of antiseptics, there is still, unfortunately, much ignorance of the details of the technique of their employment in obstetrics.

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[1] See "Antiseptics in Obstetric Practice," Boston Medical and Surgical Journal, Vol. 16, No. 4, p. 73.

[2] System and tables of life insurance from the experience and records of thirty life offices, Levy W. Meech.

TECHNIQUE.—Since the first introduction of the antiseptic practice, the whole tendency of progress has been toward greater and greater simplification of its details; and that is to-day the best system, which, while affording complete protection to the patient, is most easily and conveniently applied by the physician. The system which is now in use in the obstetric institutions above referred to, and in the private practice of the great majority of

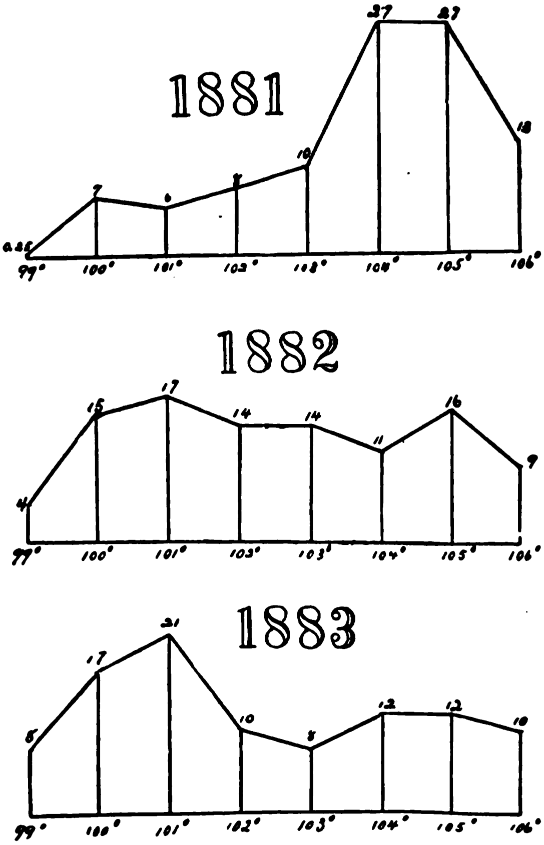
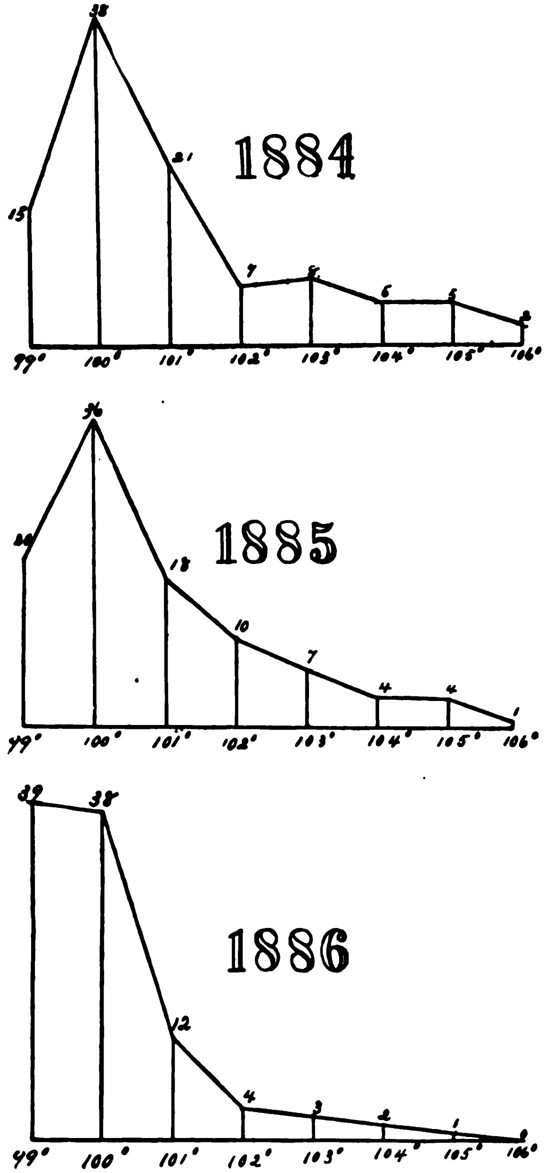


FIG. 7.—GRAPHIC REPRESENTATION OF THE SEPTIC PERCENTAGES



OF THE BOSTON LYING-IN HOSPITAL FROM 1881 TO 1886.

specialists, involves so little trouble that it may easily be incorporated into the private practice of any physician. The only materials which are absolutely necessary for its application are a box of aseptic vaselin, preferably combined with the oil of eucalyptus, in the proportion of a drachm to an ounce,[1] a few of the compressed tablets of corrosive sublimate, prepared by most of the wholesale druggists, a nail-brush, and a roll of absorbent cotton or absorbent waste.

Upon entering the bed-room and before making the first vaginal examination, the physician should carefully wash his hands with soap and water, and thoroughly cleanse the finger nails and the folds about their base with the nail-brush. The soap should then be carefully rinsed from the brush,[2] and the hands again scrubbed, with the nail-brush, in a solution of corrosive sublimate, 1:4,000, which is prepared by dissolving one of the tablets in two quarts of water. The finger is then anointed with the eucalyptus vaselin and the examination made, care being taken that the examining finger touches nothing between the time of its emergence from the basin and its entrance into the vagina.

If, then, labor is found to be present, the nurse should be directed to carefully cleanse the vulva, and the anal region, with the solution of corrosive sublimate; and a vaginal injection of the same solution should be given. The cleansing of the hands should be repeated before each successive examination.

After the expulsion of the head, the placenta should be expressed by Credé's method; and unless the perinæum is lacerated, care should be taken that nothing is thereafter allowed to separate the vulva, or enter the vagina. At the conclusion of labor the vulva is again thoroughly scrubbed and the vaginal douche is repeated.[3] A piece of absorbent cotton or absorbent waste which has been previously wrapped loosely in cheese-cloth, wrung out in the mercurial solution, and dried in a clean atmosphere, is then placed over the vulva and secured in place by the ordinary napkin. This is changed whenever the patient passes urine or fæces, and about once in six hours during the convalescence, as a matter of routine. At each change of napkins the patient is placed upon a disinfected bed-pan, and the vulva sprayed off with the corrosive sublimate solution, through a watering-pot nozzle, with which the Davidson and many other syringes are now provided.

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[1] This should be so small that a fresh box can be provided for each case of labor, the remaining vaselin, if any, being set aside for other uses.

[2] Soap and corrosive sublimate form an inert compound.

[3] The physician will find it conduce greatly to the comfort of the patient, if the hair of the vulva be cut off close to the skin—a precaution which does much to minimize the danger of subsequent infection.

If the use of the catheter becomes necessary, the instrument, the neighborhood of the meatus, and the hands of the attendant who passes it are first carefully disinfected with the same solution.

These few precautions are those which have produced the remarkable results above quoted, and which in the experience of all who have carefully used them have so greatly decreased the anxieties of obstetric practice.

After the birth of a putrid fœtus, or when the hands or instruments have been passed into the uterus, an intra-uterine injection[1] of warm 1:5,000 corrosive sublimate solution, followed by a few ounces of a weak solution of carbolic acid may properly be given; and this precaution is also advisable after the birth of a macerated fœtus, and in operative cases in which any flaw in the antisepsis has been observed.

All instruments which it may be necessary to use during delivery should first be scrubbed with soap and water, and then placed for at least five minutes in a one to twenty solution of carbolic acid, and it is a wise precaution to subject any complicated instruments to an immersion for twenty minutes in boiling water, after each occasion upon which they have been used.

It may be objected that the after-treatment described requires special training upon the part of the nurse. It is, however, so simple that it may safely be intrusted to any fairly intelligent unprofessional attendant; and for that class of practice, in which the possession of even a fair degree of intelligence cannot be expected from the family of the patient, it is comforting to remember that although the best results are obtainable only by the full observance of all these precautions, it is yet a fact that if the labor be aseptically conducted, and all meddling with the vagina during convalescence be scrupulously avoided, the absence of severe septicæmia, and a practical immunity from all but its mildest grades can be confidently expected. This statement is based upon the results of the last three years' work of the out-door clinic connected with the Boston Lying-in Hospital, in which more than 800 patients are annually confined under the care of students. The material is drawn from among the most squalid and degraded inhabitants of the city, the surroundings are usually those of a filthy tenement house; and though no attempt to enforce antiseptic precautions during the puerperium is ordinarily possible, yet the strict observance of asepsis during labor has reduced the mortality in this clinic from a very high one in former years to .002 in 1886, nothing in 1887 and 1888, .00125 in 1889, and nothing again in 1890; and has enabled us to record the unusual success of having recently confined more than 1,000 consecutive cases, under all the disadvantages of an out-door clinic, without a death from any cause.

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[1] The technique of intra-uterine injections, and of the treatment of septicæmia when actually present, is described under the head of septicæmia in the section on the puerperium.

THE LYING-IN CHAMBER.—When circumstances render a choice of rooms possible, that which is selected should be at a distance from the water closet, and should contain no set-basin. It should be well ventilated, and easily warmed and cooled. In ordinary cases it is unnecessary and impracticable to remove the carpet, pictures, etc., as is sometimes proposed; but the room should be thoroughly swept and cleaned, and well-aired, and the curtains and other hangings should be reduced to as small a number as is consistent with the comfort of the patient.

THE OBSTETRIC BAG.—It is highly conducive to the performance of exact and careful work in obstetrics to have all the instruments and materials necessary for the successful conduct of a case of labor collected together in one bag; and if the destructive instruments be excluded, this is easily possible within the limits of an ordinary hand-bag. It is convenient to keep the instruments for craniotomy and decapitation wrapped together in a separate bundle, and to assemble in a single bag all the instruments which are necessary for ordinary cases.

The bags which are used in the out-patient department of the Boston Lying-in Hospital are fifteen inches long, four wide, and six high; and contain a number of tablets of corrosive sublimate; an ounce bottle of a 95% solution of carbolic acid; a half-ounce bottle of Monsel's solution; three ounces of a solution of chloral hydrate in checkerberry water, fifteen grains to the drachm; an ounce of the fluid extract of ergot; a bottle of collodion; a half ounce of laudanum; and a small vial of powdered iodoform. All of these bottles are protected from accidents, by inclosure in one of the tin cases used for the transmission of liquids through the mails, a convenience which can be procured from any apothecary at a cost of a few cents. The instruments consist of a nail-brush; a No. 10, English, gum-elastic webbing, male catheter; a Davidson's syringe with rectal and vaginal nozzles; scissors, needle-holder, and straight and curved needles for the repair of the perinæum; a pair of Brown's modification of Simpson's forceps, a pair of Reynolds' traction rods, a scale with which to weigh the baby; a hypodermic syringe; a stethoscope; a pair of tongue-forceps, and a gag; to which is added a pelvimeter. A pocket upon the inside of the bag contains a roll of silver wire, some aseptic catgut, and braided silk; a piece of narrow bobbin cut into lengths of eighteen inches, and used for securing the cord; and a piece of broad linen tape, for use as a fillet. Ether, brandy, and absorbent waste should also be placed in the bag unless the patient is known to have provided them.

These bags have proved sufficient for the administration of a large clinic, and with the roll which contains the destructive instruments, are all that is necessary for any ordinary case in private or consultation practice. They weigh when complete about seven pounds.

PREPARATION FOR DELIVERY.—When the attendant is satisfied that labor is actually present, and likely to go on, the following articles should be assembled upon a table, in anticipation of the necessity for their use; two basins, one for soap and water, one for corrosive, a nail-brush, a quantity of small wads of absorbent material, ice broken into pieces of rather less than the size of the fist, a few ounces of brandy, a bottle of ether, one of Monsel's solution, a hypodermic syringe, a Davidson or fountain syringe, and anything else which may be likely to be necessary in the individual case. Two pails or other vessels large enough to hold a child should be procured, placed within reach, and filled, the one with hot, the other with cold water, as soon as there is any probability that the child will be born within half an hour.

BED.—The preparation of the bed, the superintendence of the dress, etc., belong properly to the province of the nurse, but in her absence from any cause, may fall to the share of the physician, and are, therefore, matters with the details of which he should be thoroughly conversant. The bed may be prepared for labor by protecting the mattress from the fluid discharges by spreading over it a piece of rubber sheeting, or in the absence of this, a rubber circular or piece of oil cloth; but when all possible conveniences are procurable it is best prepared by laying a large piece of rubber sheeting next to the mattress, and with the smooth or water-proof side up, over this is spread a sheet, over this a smaller piece of rubber sheeting, again with the water-proof side up, and over this again a draw-sheet, which is so placed in the bed that its middle shall be under the hips of the patient.

As it is distinctly desirable that the physician should be able to show himself an expert in all the practical details, it may not be out of place to speak briefly of the proper method of spreading the sheets upon a bed. Each sheet is made with a broad hem across one end, and a narrow one across the other. The broad hem is always placed at the head of the bed, and in spreading the under sheet, that side of the hem upon which the stitches show should be placed next to the mattress, while with the upper sheet, this side should be uppermost, so that when the sheet is turned down over the blankets, the smooth side appears.

In case the patient is provided with but a single rubber, an old blanket or comforter, or some similarly absorbent material should be folded several times, and laid under the hips to absorb the discharges.

DRESS OF THE PATIENT.—During the first stage the patient is most comfortable if dressed in a wrapper or bed gown worn over the night shirt, and throughout labor most patients prefer to wear stockings. The only special preparation necessary, is that much soiling and wetting of the bed and of the patient's night clothes may be avoided by folding a sheet to a width which is a little greater than the circumference of her waist, and to the length of her ordinary skirts. A piece of tape should then be passed through the fold of this sheet, and tied about the patient's waist in such a way that the opening in the sheet corresponds to her right hip, provided she is to be delivered, as is usual, upon the left side. The unbroken side of this apron is then under the patient at the time of delivery; and if care be observed to draw the night-shirt upward, it is usually possible after labor to remove the sheet without soiling the night-gown, and thus spare the annoyance and exposure of a change of clothing. It is decidedly a comfort to the patient if she is advised to wear a napkin such as is ordinarily used at the menstrual period, from the time that labor begins; and it is a wise precaution to place the obstetric vulvar pad inside this as soon as the initial douche has been given. This, however, is not essential.

CHAPTER VIII.

NORMAL LABOR.

Physiology and Mechanism of Normal Labor in Anterior Positions of the Occiput.[1]

LABOR is commonly divided into three stages; the first stage is the stage of dilatation, and extends from the beginning of labor to the time when the os becomes fully dilated, or dilatable. The definition is simple, but in practice it is sometimes difficult to draw a sharp line between the first and second stages, and a better division is to say that all cases are in the first stage so long as the obstacle to the progress of labor is the resistance of the os itself, thus putting into the second stage the not uncommon cases in which the os remains undilated from simple lack of pressure, the membranes being ruptured, and the head delayed by a malposition or other obstacle. The second stage begins with the attainment of full dilatation or dilatability of the os, and ends with the expulsion of the child. The third stage lasts from the delivery of the child to the expulsion of the placenta.

Since a presentation of the vertex, occiput left anterior, exists in nearly seventy per cent of all cases of labor, the description of normal labor will be given as a matter of convenience under that heading, and only the variations which are due to the existence of other positions will be given separately.

PHENOMENA OF NORMAL LABOR.—During the last two weeks of pregnancy the abdomen becomes less prominent; the frequency of urination increases, but the other symptoms of distention are markedly relieved. This phenomenon, which is commonly called the "lightening of pregnancy," is due to the entrance of the head into the pelvis, under the influence of slight painless contractions, which are in fact a mere increase of the rhythmical action of the uterus which is constantly observed throughout pregnancy. This "lightening" is usually most marked in primiparæ.

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[1] Although natural delivery in posterior positions of the occiput belongs properly under normal labor, the principles which govern its management are so closely identical with those which underlie the operative treatment of such cases, that it is proposed to postpone their consideration to a separate chapter, which, to save repetition, will be placed after the chapters on forceps and version, in the section devoted to abnormal labor.

The advent of labor may be announced by a sudden and unexplained rupture of the membranes, which occurs, probably, during the acme of one of these unperceived contractions, but is more commonly initiated by the appearance of abdominal pains occurring at infrequent, and slightly irregular intervals, the so-called "dolores presagientes."[1] The pains at first are short and teasing, situated usually in the small of the back, and occurring at intervals of fifteen minutes or more. As labor progresses, they occur at shorter and shorter intervals, and constantly increase in severity and duration, but the later pains, though far more severe than those which usher in the approach of labor, are often less annoying to the patient. No progress is likely to be made till the intervals are of regular duration: but when the pains have become regular, the cervix is shortened, and the os dilated, true labor is usually present. After rupture of the membranes true labor invariably comes on, though it may be delayed for some hours and even days.

False Labor.—The term false labor is properly restricted to the appearance during the later months of pregnancy of pains which, though distressing to the patient, have little or no effect upon the os and cervix. This is to be treated by the administration of bromide, or chloral, and the adoption of rest and such other measures of hygiene as tend to depress nervous excitability. The term is also, but less properly, applied to cases in which labor pains start up somewhat prematurely and effect some degree of dilatation of the os; but disappear, and are succeeded by recontraction of the cervix, either spontaneously, or as a result of the use of rest and opiates. This phenomenon is most commonly seen in multiparæ, but may occur in first pregnancies.

FIRST STAGE.—Dilatation of the os is best accomplished by the membranes, which should therefore be preserved whenever possible until the termination of the first stage of labor. It may occasionally happen that a discharge of waters has been noticed, while on vaginal examination apparently intact membranes are found presenting. This may be accounted for in one of two ways; a small rupture of the membranes may have occurred high up, and after the discharge of a small quantity of water, the opening may have been closed by retraction of the uterus or by the settling of some part of the fœtus against it; but more frequently the liquor which was lost was in fact a collection between the two layers of the membranes, the outer of which ruptured and allowed escape to the water, while the second and usually tougher layer retains

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[1] The sensation of pain is so uniformly an accompaniment of the contractions of the parturient uterus that the word pain has come to be synonymous in this connection with uterine contraction, but it must not be forgotten that the intensity of the pain is not necessarily an index to the vigor of the uterine forces.

behind it the true liquor amnii. The efficiency of the membranes depends largely upon the extent to which they bulge through the os, as may be seen by reference to Fig. 8. The conditions which promote this bulging of the membranes are sufficient elasticity of the membranes themselves, freedom from adhesion between the membranes and the lower segment of the uterus, and free communication of that portion of the waters[1] which is contained between the head and the presenting part of the membranes with the main body of liquor behind the child. It is evident that if the membranes are adherent to the edges of the internal os or if the head is in direct contact with the membranes, and so closely crowded down into the tense lower uterine segment as to form a ball valve and prevent the descent of the waters, no bag of membranes can be formed, and dilatation must be conducted by pressure of the head without aid from the fluid pressure of the dilating bag. When this condition is found, the finger should be passed as far as possible between the os and membranes and swept around the whole circumference in order to break up any adhesions which may be present; if, when this has been done, the membranes still fail to bulge, the head should be gently lifted by the fingers and a portion of the water allowed to pass by it in order to form the fore waters.

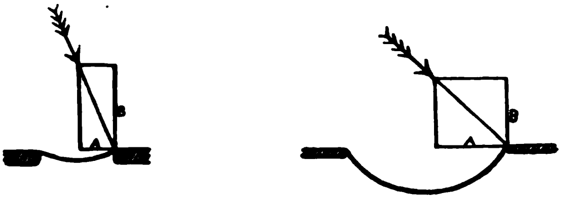

FIG. 8.—DIAGRAMS ILLUSTRATING THE ACTION OF THE MEMBRANES IN DILATING THE OS. The force of fluid pressure is always exerted at right angles to the surface; and in all of the diagrams, if the diagonal line represents the total force, the line A represents the portion of that force which is useful in dilating the os, and the line B that which is wasted.

In primiparæ in whom the head has already entered the pelvis, the cervix is sometimes found to be so stretched around the undilated os, as to form an almost membranous hood over the presenting part. In this condition the formation of a bag of fore-waters is impossible, and the muscular fibres of the cervix are usually so far paralyzed as to be incapable of exerting traction on the edges of the os. This usually results in so pronounced a stasis of labor as to require manual dilatation of the cervix, but since the forced stretching of such an os almost always, if not invariably, involves extensive lacerations, it should not be attempted until distinct indications arise. The condition is referred to here in order to suggest the necessity for caution lest the finger should overlook the presence of a thin-edged os, and the belief should be entertained that the os is completely dilated and the second stage under way. The results of an application of forceps to the substance of the cervix can easily be understood.

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[1] The so-called "fore-waters."

In certain cases the toughness and elasticity of the membranes may be so great as to lead to their persistence after the dilatation of the os, and to their descent into the vagina or even into the external world by dilatation of the vulva; and, in exceptional cases, the birth of an intact ovum has been noticed, even at full term. This phenomenon is normal in many of the lower animals, and has been regarded by some as desirable in the human race, but it is generally believed that when full dilatation of the os has been accomplished, the function of the membranes is finished, and that it is, on the whole, best that they should be ruptured, either spontaneously or by the attendant.

In cases in which the membranes rupture before the termination of the first stage of labor, dilatation must be effected by the descent of the head, a process which is always slower, and which is more likely to result in laceration. The length of the first stage of labor in any event varies greatly in different cases, and is usually longer in primiparæ than in multiparæ. For the purposes of practice, however, the length of labor should be computed, not by the lapse of time alone, but by an estimate of the amount of force that has been expended, taken in connection with the time, since patients are usually less exhausted by slight pain of many hours' duration, than by severe and vigorous contractions during a much shorter time. The amount of contraction should be estimated by the amount of caput present, and by observation of the tension of the uterus and membranes, during the pains, as gained by abdominal palpation and vaginal examination; the complaints of the patient being wholly unreliable guides.

Exhaustion is dependent upon the strength of the pains and the amount of suffering, and only secondarily upon the length of time spent, and is to be estimated more by observation of the pulse of the patient than in any other way.

In multiparæ the head often remains high and free above the brim until rupture occurs, and then descends to the perinæum during one or two of the first succeeding pains.

SECOND STAGE.—The second stage of labor is usually divided into three subsections; the descent of the head, the expulsion of the head (perineal stage or stage of expulsion), and the delivery of the trunk.

Descent and Flexion.—With normal relations between the mother and child, descent can occur only after flexion has been attained. The head usually presents at the inlet in a position midway between flexion and extension, but as soon as descent begins the pressure of the pelvic walls causes flexion, owing to the fact that pressure exerted against the frontal end of the head is more effective because exerted against the longer end of the cephalic lever. The head then descends in the oblique diameter until it reaches the resistance of the pelvic floor, when the occiput rotates forward in the direction of the least resistance.

Rotation.—The occurrence of rotation is due to the fact that the occipital end of the head, being lowest, is the first to reach that portion of the canal in which the changed axis of the pelvis makes a change of direction necessary. At this point (Fig. 9) the posterior wall of the pelvic canal is formed by the firmly resistant sacrum and coccyx, while the anterior is made up only of the yielding vulva.

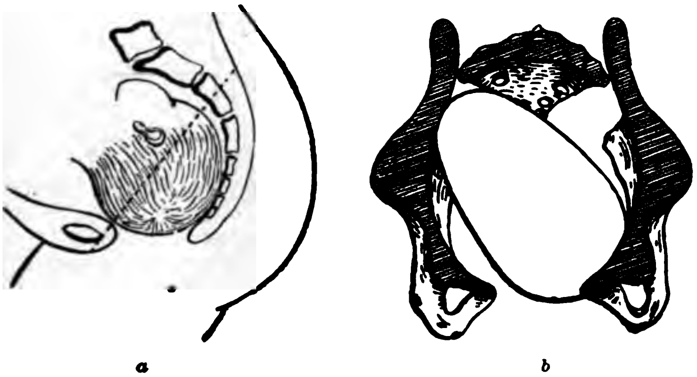

FIG. 9.—DIAGRAMS ILLUSTRATING ROTATION. *a*, Sagittal section; *b*, cross section through dotted line in *a*.

The occiput, resting as it now does in the lower half of the pelvis, is exposed posteriorly to the thrust of the shelving planes of the bony posterior and lateral walls; and is in front resisted only by the soft tissues of the vulva, the biparietal diameter being below the edge of the pubic arch. The sinciput, which still occupies the upper part of the pelvis, is, on the other hand, exposed on its forward and outer side to the close bony pressure of the lateral walls; while behind, it is in apposition with the considerable space afforded by the sacro-iliac notch, and filled only with soft and yielding tissue. The occiput being exposed to an excess of pressure on its posterior surface, and the sinciput to an excess of pressure anteriorly, the result is rotation; but it must be noted that this is dependent upon flexion, since if flexion is lost, and the sinciput and occiput occupy approximately the same plane of the pelvis, both are exposed to an excess of pressure upon the same side, and there is nothing to produce rotation.

When these forces have brought about rotation, the occiput sinks into a lower position in the pelvis, and enters the gutter formed by the lower part of the sacrum and the muscles of the pelvic diaphragm (Fig. 10); it is then held in its anterior position by the lateral pressure of the ischial-tuberosities, and further rotation is therefore impossible; and since the head as a whole lies against the shelving surface of the sacrum, coccyx, and perinæum, the movement of expulsion at once begins.

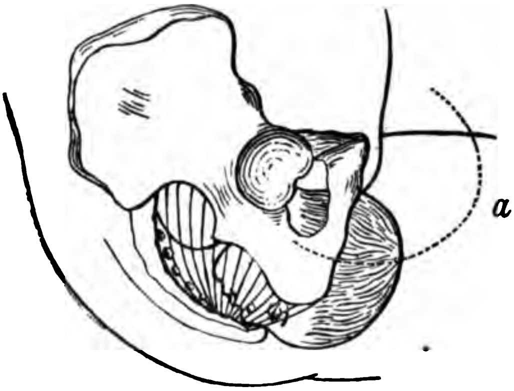

FIG. 10.—DIAGRAM OF THE STAGE OF EXPULSION. *a*, Curve of Carus.

Expulsion.—The occiput is now free from all but lateral pressure, but the frontal end of the head still rests at the bottom of a gutter formed by the shelving posterior wall, and as the child is pressed down from above by the uterine contractions, the sinciput is in its turn driven forward, forcing the occiput before it. The motion of the head during this stage is directly forward until the occipital protuberance escapes from under the edge of the symphysis, when the occipital end being entirely freed from pressure, and the neck arrested by the pubic arch, the continued forward motion of the frontal end of the head, which persists under the influence of the intra-uterine forces, results in a movement of extension of the head upon the trunk, by which the forehead, face, and chin are successively swept over the fourchette and brought into the world. This movement of extension usually begins at the time that the large fontanelle appears at the edge of the perinæum.

Delivery of the Body.—At the time when the head emerges the shoulders are still in the pelvic canal, which they of course enter in the opposite oblique diameter, and as the continuance of the uterine contractions drives them onward, their rotation under the same forces results in the movement which is known as external rotation or restitution, by which the occiput is made to turn again to the side on which it originally was.

The shoulders then move forward under the influence of the pelvic planes until the perineal shoulder appears at the vulva; by continuance of the same motion the anterior shoulder is released from the pubic arch (Fig. 11), and upon the disengagement of the shoulders the whole trunk follows rapidly.

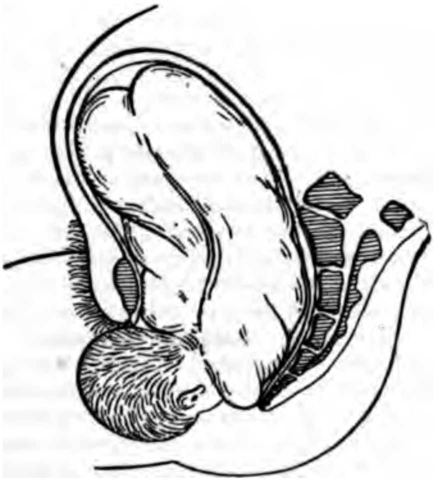

FIG. 11.—EXPULSION OF THE SHOULDERS.

THIRD STAGE.—After the delivery of the child the uterine contractions commonly cease for a short time, but after the expiration of a few minutes they begin again, and under normal circumstances but a few pains are required to expel the placenta into the vagina; the muscular contractions of the vaginal walls urge it onward, it dilates the perineum and sweeps forward in the same "curve of Carus" (Fig. 10) that must be traversed by any object that is born from the vagina.

The mechanism by which the placenta is freed from the uterus has been described in two ways, both of which probably occur. In some cases a decrease in the size of the uterine walls tears away the placenta and membranes from their attachments, and it is then driven into the vagina, edge foremost, by direct pressure upon its substance from the uterine wall. In other cases it is probable that the blood poured forth from the utero-placental sinuses accumulates behind the after-birth, until the mass has attained sufficient size to excite contraction of the uterus, which then drives the doubled up placenta and membranes into the vagina under the influence of the fluid pressure of the retained blood. The question of the relative importance of these two methods of expulsion is interesting and has of late attracted much attention; the only practical point, however, is that the expulsion of the placenta in the expanded form requires the exertion of much more force than when its lateral edges present, so that if artificial assistance be necessary to its delivery, it is always best to attempt to withdraw it in the latter manner.

Management of Normal Labor, Occiput Anterior.

FIRST STAGE.—When the physician is first summoned to the bedside of the parturient woman, he should remember that the patient, especially if she be a primipara, is worried and anxious, and full of apprehension about the pain she is to suffer and the possible dangers of labor; and that he owes his first duty to her mental rather than to her physical condition. Much may be gained, moreover, by simple inspection of the patient, and if the stage of labor permits it is better to spend a few moments in conversation with her, rather than to hurry at once into the usual examinations. He should endeavor to assume a calm and thoroughly matter-of-fact manner, which will convince her at once that he, at least, is unflurried and expects nothing unusual. He should feel the pulse, should note the condition of the patient's nervous system and the frequency and character of her pains, and unless he is previously familiar with it, should endeavor to form an estimate of the probable strength and constitution of the individual woman. When he has succeeded in quieting the patient's fears and in accustoming her to his presence, he should prepare the usual corrosive solution, unless that is already ready;[1] he should then palpate and auscult the abdomen and make the usual vaginal examination; after this he is expected to assure the patient that everything is all right, *i.e.*, that the head presents, and no unusual difficulty is to be apprehended, and if for any reason it is impossible to give this assurance conscientiously, the greatest care should be exercised to avoid any direct statement that anything is wrong; but if a malpresentation or other abnormality exists it is essential to the physician's reputation that the husband or other responsible relative should be informed of it at once, being directed at the same time not to tell the patient.

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[1] It is always well to leave the obstetric bag in another room, as the sight of the instruments, and the sound made by rattling them together in withdrawing any article from the bag, will often give a nervous patient the impression that some severe operation is in immediate contemplation.

One of the first questions asked of the physician in most cases is about the probable duration of labor, but this can only be answered by the assurance that all progress is dependent upon the quality of the pains, and that that is always so uncertain that it is impossible to offer an opinion of value upon the point of time. It is usually best to give the most hopeful view possible to the patient, without committing one's self to an exact statement; but if the question is asked, not by the patient, but by the husband or other members of the family, it is usually preferable to state the case as it appears, without disguise, since an assurance to them that the labor is likely to be short and easy is liable to be interpreted as a confession of ignorance in case of subsequent delay.

The conditions which make rapid progress probable are the existence of strong pains at regular and not very long intervals;[1] the facts that the os is soft and a considerable degree of dilatation has been reached in a short time; that the head is not very high in the pelvis; that the presentation is normal; that the membranes are intact and bulge freely through the os; and that the patient, if a multipara, has had a history of rapid confinements on previous occasions. The opposite conditions of course predispose to delay.

It is rarely necessary or indeed advisable for the physician to remain in the house continuously during a long first stage, and the question whether to remain within call at any given stage of dilatation must always be answered by an estimate of the amount and rapidity of the progress which has been made up to that time. If true labor is present, it is seldom wise to absent one's self for more than a few hours at a time.

It is best that the first visit should be of at least an hour's duration, and that before leaving, the physician should make a second examination in order to be able to judge of the rapidity of progress. In all cases the early stages of dilatation consume much more time than the later, and it may be laid down as a general rule that continuous presence is seldom necessary with primiparæ until the os has reached the size of a silver dollar, though with a multipara it is unsafe to be long absent after the size of a silver quarter has been attained.[2]

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[1] The best type of pains is when the intervals average about two minutes and the pains about three, but this is seldom attained until during the second stage.

[2] The amount of dilatation is usually reckoned by comparison of the size of the os with standard coins, thus the os reaches successively the size at which it admits the tip of the finger, the size of a silver ten-cent piece, of the silver quarter, half-dollar, and dollar, or is said to be half or two-thirds dilated, after which any further progress is estimated by the length of the portion of the cervix which is still to be felt; thus we may say that an inch or half-inch of cervix still remains.

Under normal circumstances the treatment of the first stage is largely expectant. The physician should maintain an attitude of watchfulness, should hold himself in readiness to detect the first signs of delay or abnormality, and should refrain from interference so long as steady progress is being made.

With sufficient care a diagnosis of presentation and position can usually be made at the first visit, and the importance of an early diagnosis can hardly be exaggerated, since malpositions which could be corrected with entire ease at an early period of labor, may often, if neglected, require the most serious obstetrical operations.

In case the first examination fails to afford a satisfactory diagnosis of the presentation or position, it should be repeated at short intervals until that object has been attained. If, as occasionally happens, repeated abdominal and vaginal examinations fail to afford a satisfactory diagnosis, the conduct of the physician must be determined by the progress of the case; if dilatation and descent go on with normal rapidity, he is usually justified in waiting for the rupture of the membranes, without resorting to any more heroic means of diagnosis; but if the diagnosis of presentation or even of position is unknown, and the progress of the case is unsatisfactory, the attendant is always justified in a somewhat early resort to the more efficient methods of diagnosis, which will be referred to under the head of difficult or delayed labor.

If, after full dilatation has been accomplished, the membranes fail to rupture spontaneously, they should be torn by the attendant, and this should be done in the interval between pains, since perforation of the membranes and the consequent sudden escape of the liquor amnii during a contraction might easily result in prolapse of the cord, an accident which seriously compromises the safety of the child.

If the head is well engaged, the presenting part of the membranes should be ruptured by gentle scratching with the nail of the examining finger, or by seizing a portion between the tips of two fingers and tearing it by a gentle twisting motion. Should these methods fail, a disinfected probe, director, or even hairpin may be passed through the membranes, under the guidance of the finger.

If the head is free above the brim, and a direct rupture is thought to be unsafe, on account of its likelihood to produce a prolapse of the cord, recourse may be had to rupture of the membranes at some distance above the brim by the insertion of a catheter. The best instrument for this purpose is a male English webbing catheter, furnished with a wire stylet. The catheter should be softened in warm water, and the last inch of the stylet should be bent at an angle. The instrument should be gently and cautiously inserted between the membranes and the uterine wall, to a height of several inches above the os, and then sharply rotated in the direction which will force its bent end into and through the membranes. The withdrawal of the stylet will then permit the escape of such a quantity of liquor as may be judged sufficient to produce enough retraction of the uterus to insure contact between the breech and fundus; and when the retraction has produced an engagement of the head, a direct rupture should be resorted to; this partial withdrawal of the waters also often excites the uterus to renewed activity, by decrease of its distention.

During the first stage it is unwise to annoy the patient by too frequent examinations, and the physician should endeavor to so time them that he can confidently expect to note some difference in the patient's condition with each repetition. Each examination should include an auscultation of the fœtal heart, since it must not be forgotten that the obstetrician is always in charge of two patients, and is responsible for the life of the fœtus as well as for that of the mother.

The position of the patient during the first stage should depend largely upon her own preference. Labor usually progresses more rapidly if the patient retain the erect position, and if from time to time she moves about the room, but this should not be insisted upon, if it is evidently fatiguing to the woman, nor is it usually best to require its continuance after the pains become so severe that the patient feels the necessity of support during their presence.

During labor few patients are conscious of appetite or ready to take food, but during long first stages it is always important to prevent exhaustion and faintness, by an occasional administration of broths or other simple nourishment; though in view of the possible necessity for etherization it is well to prohibit milk and solid food.

The physician should remember to absent himself from time to time in order to permit the patient to pass urine, and he should inform himself if this is done, since there is no more common cause for delay than the presence of a distended bladder, and in case of any question as to the completeness with which the patient has emptied her bladder it is, therefore, always best to pass the catheter. The general principle which should be observed throughout the management of the first stage of labor, is non-interference with the process so long as normal progress is present, and a careful watch for the advent of exhaustion. The patient should be urged to avoid unnecessary effort, and should be especially cautioned against all voluntary bearing down during the contractions—an effort which during the first stage can be productive of nothing but fatigue. In addition it must not be forgotten that while physical exhaustion is promptly signalled by a rising pulse, there is in all women a capacity for fatigue of the nervous system, which must be guarded against with equal care ; and the existence of which is to be gathered from the behavior and general aspect of the patient, and from her mental condition, rather than from any physical signs.

The sudden and marked appearance of extreme irritability, nervousness, and short temper on the part of a commonly good-natured woman is, during labor, a phenomenon of some significance, and may culminate, if neglected, in uterine inertia, eclampsia, or even in the insanity of parturition. The gradual supervention of irritability is, upon the other hand, a matter of small importance.

The treatment of nervous exhaustion in labor consists in the arrest of its cause by the rapid termination of labor, should that be necessary, and in the use of nervous sedatives. For this purpose two drugs stand pre-eminently above all others. During the earlier portion of the first stage, and when there is in all probability a considerable length of time still before the woman, hydrate of chloral is often of the greatest value, especially as the existence of labor affords a toleration for this drug in doses which would be dangerous or even fatal to the non-parturient woman. The best method of using it is the administration of fifteen grains, if given by the mouth, or twenty by the rectum, in a solution of checkerberry water, or other vehicle, to be repeated twice, if necessary, at twenty-minute intervals; but this total of fifty grains by the mouth, or sixty by the rectum, should never be exceeded. The second or third dose is followed, in the majority of cases, by drowsiness and sleep of some hours' duration, after which the patient commonly arouses in a greatly refreshed condition, and labor often proceeds with considerable rapidity.

If, on the other hand, the os is already tolerably well dilated, the pains strong and regular, and the second stage at hand, it frequently happens that chloral fails to afford relief, so that in such cases it is usually better to withhold this drug, and substitute for it the obstetric use of ether, which is its administration to the point of toleration of pain, without loss of consciousness, in contra-distinction to its surgical use to full anæsthesia. The patient should be furnished with a cone or folded towel, and allowed to give the ether to herself, being placed, however, in such a position that the cone will drop as soon as the grasp of her hand relaxes. The physician or nurse should sit by her side in readiness to restore the ether to her whenever the pains arouse the desire to renew it. Ether given in this way has, in the majority of cases, little or no ill effect upon the progress of labor, and may be administered for many hours to the great comfort of the patient and without ill results.[1]

SECOND STAGE.—We are usually warned of the beginning of descent by a marked change in the cry of the patient during her pains, for whereas the cry of the first stage is that of an irritated, discouraged woman who despairs of any relief, it is replaced, on the advent of descent, by a peculiar groan expressive of bearing-down effort, and frequently full of renewed energy. So soon as this change is perceived or when vaginal examination demonstrates that full dilatation has been accomplished, every effort should be used to encourage the bearing-down efforts which were before prohibited. The patient, if previously about the room, should be put to bed, and a rope or folded sheet should be tied to the foot of the bed near her feet, so as to furnish a fixed point upon which she can pull during her pains, an effort which is agreeable to most women, and which encourages voluntary efforts by fixation of the costal origins of the auxiliary abdominal muscles; she should be encouraged to hold her breath and bear down throughout the whole of each contraction, caution being taken, however, to prevent her making such violent efforts as to exhaust her muscular powers too soon.

Throughout the second stage examinations should be made with sufficient frequency to enable the physician to form an accurate judgment of the rate of progress;[2] he should also from time to time estimate the amount of force which is being expended, by observation of the increase of the caput succedaneum, and of the tension of the abdominal walls and uterus; and, in addition, should note the rate of the mother's pulse and of the fœtal heart at each examination.

If progress is normal or slow, the patient must be urged to keep up or increase her voluntary efforts, and encouraged with the hope of speedy relief and by the assurance of constant advance; but if, on the other hand, the adaptation between mother and child is easy, if the pains are powerful, and in the judgment of the attendant there is more danger of undue precipitation and of laceration of the soft parts than of delayed labor, she should be instructed to avoid effort and taught to open the mouth and to draw her breath in short quick gasps like a panting dog, during the continuance of each pain, this rapid action of the chest preventing the use of the accessory muscles. If even with these measures too rapid progress still threatens, the administration of ether to the point at which the contractions are lessened by the anæsthetic is always proper and advisable.

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[1] Whatever claims may be urged for the use of chloroform for surgical anæsthesia during labor, its greater dangers make it less valuable for this continuous use than is its rival, ether.

[2] In estimating the progress of descent it is highly important to avoid the error of confounding the lowering of the vertex which follows upon growth of the caput and moulding of the head during labor, with an actual descent of the presenting part, which latter movement can only be correctly judged by passing the finger as high up as possible between the head and pelvic wall in order to estimate the height in the pelvis of the girdle of contact, *i.e.*, of the greatest diameter of the head.

Preservation of the Perineum.—When the head begins to press against the pelvic floor and the perineum is seen to bulge outward during the acme of each pain, the stage of expulsion is at hand, and with that begins the most important function of the physician during normal labor; *i.e.*, the preservation of the perineum.

The percentage of cases in which laceration of the perineum necessarily occurs is very variously estimated and must always depend, not only upon the method employed, but on the skill of the individual accoucheur. The various forms of technique which have been and still are employed by one or another school of obstetricians are too many for enumeration, but any method which is to be successful must combine certain pre-requisites; it must avoid direct compression of the perineum between the presenting part and the hand of the obstetrician, or any other substance; must be able to check the advance of the head absolutely and at any moment; and finally must put it in the power of the attendant to guide the movements of the presenting part in that direction which is at the moment likely to decrease the tension on the mother's soft parts in the highest possible degree; for it must be remembered that abrupt movements of descent, even though of small extent, are far more likely to produce laceration than marked but gradual progress, and that the change of direction which accompanies the stage of expulsion is effected by the resistance of the muscular layers of the pelvic floor and perineum, so that laceration of these tissues is in effect a failure upon their part to possess the degree of strength requisite for the proper performance of their functions, and is to be prevented by reinforcement of their efforts by the added power of the obstetrician's hand as it urges the head forward and against the pubic arch.

Even though we eliminate the many methods which are becoming obsolete and which are thought at the present day to be improper, so many excellent plans remain, that all that can be admitted here is a description of those which have been most successful in the author's personal experience.

Position of the Patient. It should be premised that the proper preservation of the perineum invariably involves a certain amount of exposure of the patient's person, and that while it is the duty of the attendant to avoid all unnecessary denudation of his patient, it is distinctly necessary to lay aside the mock modesty which prohibits such exposure as is conducive to the proper performance of his duty. Upon the continent of Europe it is customary to deliver women in the dorsal decubitus, but this method, however excellent if the delivery is effected upon a special obstetrical chair, or with the patient in the lithotomy position, and each leg in charge of an attendant, has many disadvantages when the patient is confined upon an ordinary bed.

Delivery Upon the Side.—In this country and in England the majority of obstetricians prefer the left lateral position with the thighs well flexed upon the body, and the upper knee supported by a pillow. If the patient is delivered in this attitude the buttocks should be brought to the edge of the bed, and the shoulders placed sufficiently far from it to allow the physician to sit upon the bed opposite the position of the lumbar region. His coat should be removed and his shirt sleeves rolled up to the shoulder. The hands and arms having been thoroughly disinfected, the left arm should be passed over the patient's abdomen and between the thighs, so that the finger tips, and later the palmar surface of the hand, may be placed upon the vertex in a position to arrest the movement of expulsion. The edge of the fourchette is then constantly under the eye of the physician, a point of the utmost importance; while his right hand is at liberty to wipe the mucus from the head and vulva; to test the condition of the perineum by the insertion of the finger between the head and the vaginal outlet; and finally as the head crowns, should be used to prevent extension and a consequent undue strain upon the perineum, by pressure upon the forehead through its tissues; this pressure, being made, not upon the centre of the perineum where laceration is likely to occur, but upon its lateral portions which are thicker and practically safe. Then, as the edge of the great fontanelle appears at the fourchette, the right hand is able to prevent recession of the head and urge it forward, or as it is commonly termed, "shell the head out," by applying pressure to the face, through the tissues immediately below the tip of the occyx, and in the axis of the vaginal outlet; *i.e.*, directly forward.

Another Method.—The great advantage of the method which has just been described is the opportunity which it offers of fixing the patient's position, and making it difficult for her to move away from her attendant during the great pain of expulsion. Its disadvantage is the fact that the left hand, upon which the great strain of resisting the expulsive efforts is placed, works in a disadvantageous position, so that, unless the muscular development of the physician be distinctly greater than that of his patient, he may find his physical force insufficient for the task. When this is the case, or when the patient is so far anæsthetized that voluntary movements of her body are unlikely, she should be placed in the same position, but the attendant should place himself in a chair facing the vulva. The palmar surface of his right hand should then be placed directly against the emerging occiput, in which position the whole force of the arm and shoulder can be exerted in direct opposition to its advance, while the left hand may be used to steady the patient by a grasp upon the upper part of her thigh and the iliac crest. Since it will, however, in the later stages be needed for the control of extension and for forward pressure upon the forehead through the tissues about the anus, it is better, if the patient is not etherized and is uncontrollable, to direct the nurse to place herself upon the bed in such a position that she is able to prevent the patient from drawing away from the physician.

Rectal Expression of the Head.—In cases where the natural efforts fail to completely overcome the resistance of the perineum, the release of the head may usually be effected by inserting the first and second fingers of the left hand into the rectum, and with them exerting pressure upon the frontal end of the head. This manœuvre is not, however, usually successful until the head has advanced so far that the rectal fingers are able to seize the supraorbital ridges, or preferably the edge of the upper jaw. In this latter position a living child almost invariably begins to suck the fingers which it feels within its mouth, and is of course liable to draw in and swallow more mucus and liquor amnii than is desirable; for which reason the fingers should be shifted as soon as possible to a position in which they grasp the chin instead. When this grasp has once been effected the head is so thoroughly within the control of the hands and its motions of advance or recession can be governed with such complete facility that when laceration seems probable, it is distinctly advisable to administer ether in obstetrical degree from the beginning of the stage of expulsion, and to increase the dose as the head advances, to such an extent that when the rectal fingers obtain control of the head the ether can be pushed to full surgical anæsthesia within a few moments, during which the head can be held immovable. All the forces of expulsion and resistance are then under the control of the accoucheur, and he possesses facilities for the avoidance of laceration which can be obtained in no other way.

Avoidance of Haste. Whichever method is employed, it may be laid down as an axiom that sufficient caution and slowness in the delivery of the head will always save the perineum; to which must be added the very necessary corollary, that while the above statement is true theoretically, in practice the golden mean between unnecessary delay with its increase of suffering to the mother and of danger to the baby, and the undue haste which results in laceration, is no easy matter; and that the most skilful obstetrician will inevitably fail to save the perineum in some cases; but it is worth remembering that the majority of lacerations are due to the production of a slight nick during the early part of the stage of expulsion, which insignificant tear is converted during the distention of the orifice by the emerging head into an extensive laceration, and that it is of the utmost importance to watch and superintend each motion of the presenting part from the time that it first rests against the perineum.

An unduly long perineal stage distinctly increases the risk to the child, but although the life of the child is always of far greater value than the external tissues of the mother, it remains a fact that in reality comparatively few children are lost during the process of expulsion, and it is probably the better practice for the young obstetrician to pay more attention to the mother's tissues than to the chances of the fœtus, it being far more probable that he will fall into the error of undue hurry than of too great delay.

During the whole process of delivery the fourchette should be carefully watched, and the head should be allowed to descend slowly and gradually during each pain until the tension of its edge produces a faint and narrow white line, by compression of its capillaries, but the moment the least indication of this condition is observed, all progress should be arrested during the continuance of that pain, and until the head recedes in the succeeding interval. This process of alternate advance and recession and of watchfulness against undue tension of the perineum should be continued until the edge of the anterior fontanelle appears in sight; the head should then be restrained from recession by pressure over its frontal end, should be allowed to advance until the white line of pressure appears at the fourchette, and then held immovable until the gradual distention of the tissues effects its disappearance; an advance of from one-quarter to one-eighth of an inch will then usually cause its re-appearance, when progress should again be arrested during its continuance. This process of careful, gradual, and guarded advance should be continued until the fourchette is seen to slip over the prominence of the forehead and retract across the face, at which moment the great majority of lacerations occur; as it approaches the watchfulness of the attendant should be redoubled. As the motion of retraction begins, the hand which covers the occiput should rotate it slightly toward the side to which it was originally directed in order to remove the projecting nose and chin from the median line; where the danger of rupture is greatest; while at the same time the hand which governs the frontal end should push the whole head vigorously forward in order to promote its expulsion and lessen the tension of the tissues.

Care of the Cord.—The emergence of the chin is followed in the majority of cases by a short period of uterine inertia, during which the obstetrician should wipe the vaginal mucus from the eyes of the child, if possible before they are opened; his little finger should then be inserted in the mouth in order to sweep from the throat any mucus which may have been inspired; after which a finger should be passed rapidly along the neck of the child and across its shoulders in search of the cord, which in quite a large proportion of cases is looped in one or more turns about the neck and shoulders. If the cord is found in this situation the looser of the loops should be withdrawn from the vulva and pulled downward over the occiput of the child, or pushed back over the shoulders if this is easier. It may occasionally happen that the cord is so tightly twisted that its length is insufficient for either of these manœuvres; in such a case it should be cut with scissors between a double ligature, but this procedure should not be resorted to until several efforts without it have been unsuccessful, as the necessity for its performance is one of the things which must be borne in mind but is not likely to occur. The author has never seen an instance in which it was necessary. During this procedure the attendant must, however, hold himself in readiness to check a too rapid advance of the shoulders if the contractions again set in, it being probably a fact that a larger number of perinea are torn by the shoulders than by the head.

Delivery of the Body.—If the cord is not about the neck, or after it has been released, the finger should be passed across the chest of the child in search of the perineal hand, for if the arms of the child are flexed in the normal manner across the chest, one or the other hand is usually within reach of the fingers.

If both are accessible, that which is attached to the perineal arm should be selected, but if either hand can be drawn down by traction upon its wrist until the fore-arm and elbow sweep across the fourchette, the release of the corresponding shoulder is at once effected, and the remainder of the trunk may always be extracted without further difficulty, the advantage of this manœuvre being the fact that the bulky shoulders pass the perineum piece by piece and not all at once, thus greatly lessening the strain. If neither hand is within reach and if the shoulders do not start under the influence of the natural forces within a few minutes after the birth of the child, the right hand should seize its head, the neck lying between the second and third fingers, which seize respectively the occiput and chin; it should then be drawn forward and upward in the curve of Carus, while the left hand, applied over the anal region, urges the perineal shoulder forward. If this effort does not succeed, its failure is probably due to the arrest of the anterior shoulder behind the pubic arch. In such a case it should be swept rapidly backward until the posterior side of the neck places the perineum slightly upon the stretch, when very slight traction downward will usually release the anterior shoulder, and a repetition of the upward and forward traction will then invariably effect the delivery, but during this process the perineum must be under the most careful watch of the eye and hand. After the extraction of the shoulders the head and body should be swept upward across the mother's abdomen in the curve of Carus, while the left hand guards the perineum against pressure from the hips and heels, for while a perfectly intact perinuem can scarcely be torn by the hips or feet, it is possible for these parts to convert a nick into a serious laceration.

During the extraction of the child and from the moment it emerges from the vulva the hands of the nurse should be applied to the fundus of the uterus and should follow it down in its retraction, but without force unless demanded by the physician; and should be retained in position in readiness to prevent relaxation of the uterus by friction and kneading of the fundus, from that time until the patient is adjudged to have passed beyond the danger of immediate post-partum hemorrhage and is ready for the binder. If these precautions be faithfully followed, the loss of a sufficient quantity of blood to affect the pulse is an almost unheard-of accident.

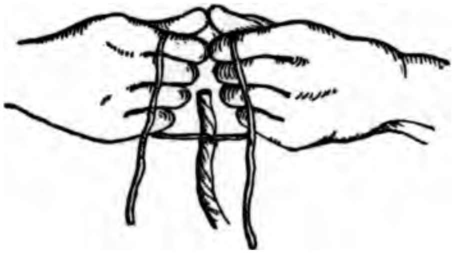
FIG. 12.—POSITION OF THE HANDS IN TYING THE FUNIS.

Ligature of the Cord.—After the delivery of the child its fauces should be again cleared of mucus and if no cause for hurry exists the physician should wait for the cessation of pulsation in the cord before tying it. When pulsation ceases, a stout cord or bit of narrow bobbin should be tied tightly around the cord at a point about two inches from the umbilicus, and secured with a double knot, in tying which care should be taken that the hands should rest against each other (Fig. 12), as separation of the cord at the umbilicus has been known to follow the twitching consequent upon breaking of the cord when the hands are being forcibly drawn apart. The baby should then be wrapt in a warm woollen cloth and laid in some position where it can neither fall upon the floor nor be stepped upon, while the attention of the attendants is directed to the mother.

Third Stage.—The expulsion of the child is usually followed by a period of uterine inertia of from one to ten minutes. During this time the uterus should be guarded by the hand and very gentle friction should be used to prevent relaxation and encourage contraction; and all insertion of the fingers into the vagina should be conscientiously avoided, there being no advantage in their entrance and its avoidance being a point of importance in the prevention of septicæmia.

CREDÉ'S METHOD OF EXPRESSION.—The expulsion of the placenta may occur spontaneously, but it is in the majority of cases effected more rapidly and to better advantage by the use of Credé's method of expulsion. This procedure has fallen into disrepute with some schools of obstetricans, but it seems probable that their disapproval is largely due to neglect of the restrictions which Credé originally laid down. Expulsion should never be attempted in the interval between uterine contractions, and the degree of force employed should never exceed a very moderate amount. It is essential that the abdominal wall should be so far depressed as to allow the fundus of the uterus to rest in the hollow of the hand, the fingers being behind it and the thumb in front (Fig. 13). The hand when in this position should compress the fundus at the moment when

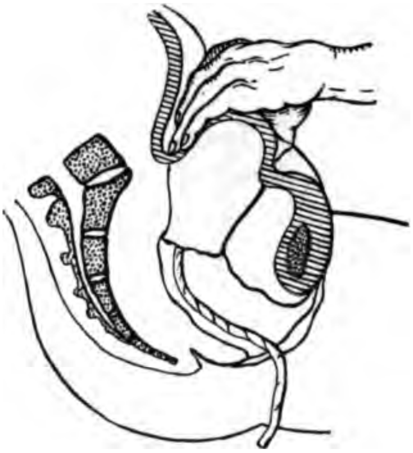

FIG. 13.—EXPRESSION OF THE PLACENTA.

a contraction is felt, the pressure being exerted only by the palm and the base of the fingers and thumb, their tips merely steadying the lower portion of the uterus, and at the moment this pressure is exerted a rapid but gentle downward impulse should be given to the uterus as a whole. In skilled hands the release of the placenta is frequently accomplished by the first effort at expulsion, and if the method be carefully applied it rarely fails of success in any hands after a few repetitions. When the placenta passes into the vagina, and a sudden decrease in the bulk of the uterus is observed by the hand, it should cease to compress the fundus and should urge the placenta to the vulva by a continuance of the downward pressure. As the placenta emerges it should be urged forward by pressure behind the perineum with the disengaged hand, the conversion of a nick into a laceration being perfectly possible even at this late moment if this precaution is not observed. As the placenta passes the vulva it should be seized and gently twisted by the hand, but no tractile force should be allowed. This movement converts the fragile membranes into a tough and twisted rope which is not liable to tear, and permits their complete extraction.

Ergot.—As soon as the placenta has been delivered it is customary to administer to the patient a drachm of the fluid extract of ergot—a proceeding which is undoubtedly unnecessary in many cases but is productive of no harm and is always a wise precaution. After the extraction of the secundines they should be examined in order to discover any abnormalities of the placenta, or incompleteness of the membranes, which may be evidence of their partial retention in utero.[1]

After the expulsion of the placenta the patient should be warmly covered up and should be allowed a few minutes' rest, and the uterus should be guarded by the hand until it has remained unrelaxed for at least fifteen minutes. A slight chill is not uncommon at this time, and though sometimes alarming to the patient, is of absolutely no importance.

Examination of the Perineum.—At the termination of labor the physician should always examine the perineum, in view of the possibility of an undiscovered laceration, and this examination should be conducted by inserting the finger into the rectum and everting the posterior vaginal wall through the vulva, in order to facilitate the detection of any intra-vaginal tears, which are extremely common and productive of at least as great loss of support as can be attributed to any external laceration.[2]

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[1] If the membranes be extended and examined by transmitted light, the possible existence of a retained placenta succenturiata may be demonstrated, if present, by the existence in their substance of large blood-vessels which terminate abruptly at the torn edge.

[2] See rupture of the perineum, page 290.

Duties of the Physician after Labor.—Bed, Binder, etc.—The process of cleaning up the bed and patient is properly the province of the nurse, but since the physician is not infrequently called upon to perform it, in cases of premature labor, or where no nurse has been engaged, it is essential that he should be familiar with its details. The patient should never be allowed to turn upon her side before the application of the binder, unless the abdomen is guarded by the hand, since its relaxed walls afford the fullest possible opportunity for the entrance of air into the vagina, or even into the cavity of the uterus, in case the patient should accidentally turn herself into Sims' position. The vulva and neighboring skin should be carefully washed with the corrosive solution; an intra-vaginal injection should be given, and any vaginal or pubic hair which has been soiled by blood or other discharges should be carefully trimmed away with the scissors. The vulvar pad should be applied, and the draw sheet and soiled clothing removed with all possible care to avoid unnecessary exposure of the patient, after which the binder should be applied. This should be long enough to meet across the patient's abdomen, and sufficiently wide to extend from below the trochanters to the lower ribs; the patient's knees should be placed closely together, the lower edge drawn as tight as possible and secured with a large safety pin, and the remainder of the binder should then be drawn and pinned together firmly but without excessive compression. The ends of the vulvar pad or napkin should be secured to the binder and the patient covered with a fresh sheet.

The physician should remain in the house for at least an hour after the birth of the child, and should not leave the patient under any circumstances until her pulse has fallen to about the normal range, post-partum hemorrhage being extremely rare with the pulse less than eighty, and almost unknown with less than sixty beats per minute.

Care of the Baby.—The mother being comfortably arranged in bed, the baby should be washed and dressed, and, though this is again the duty of the nurse, it is a matter with the details of which the physician should be thoroughly conversant. A woollen cloth should be held across the lap, and should be used to cover the baby as thoroughly as possible during the process of washing. The vernix caseosa should be thoroughly softened with olive oil, especial care being taken to completely expose the deep wrinkles which are common about the neck, groin, and other joints of a well-nourished baby. The whole surface should then be rapidly and thoroughly but gently washed with a soft sponge and pure castile soap and water at a temperature of from 90° to 95° F.

The dressing of the cord immediately after delivery is considered by many patients to be the province of the physician, and he should at all events always re-examine it before the child is clothed, in order to make certain that the ligature is sufficiently tight. The cord and the neighboring skin should be carefully washed with an antiseptic solution, carefully dried, and enveloped in absorbent cotton or in soft dry linen. If the cloth dressing is used, a hole should be cut in the middle of a square piece of old linen, and the cord should be passed through the hole until the cloth rests against the skin, when it should be wrapped securely around the cord, and held in place by the belly-band. No grease need be used, but a very small quantity may be smeared around the edges of the hole if it is demanded. The popular practice of browning the cloth in the oven is perhaps to be recommended, as an efficient sterilization. If the cord is dressed aseptically and no moisture is subsequently allowed to approach it, it rapidly dries up into a hard, shrivelled body, which separates in from five to ten days, and leaves a dry and thoroughly healed surface behind it.

The clothes provided for the baby vary greatly with the social conditions of the parents, but, although the children of the wealthy are often provided with extra garments, the various forms of dress are always based upon the same general plan; and it is believed that the following list comprises all the necessary articles, which should be adjusted to the infant in the order in which they are described:

The first garment to be adjusted is the belly-band, which should be a strip of flannel wide enough to extend from the pubes to the axillæ, and sufficiently long to be wrapped twice around the trunk. It should be wound snugly, not tightly, around the whole body, and secured in position by four small safety pins.

After the first ten days this flannel band may preferably be replaced by a cylindrical knitted or woven band, not unlike a section of the leg of a thick stocking, which possesses the advantages of rendering unduly tight pinning, and consequent compression of the chest, impossible, and of dispensing with the use of pins. The binder being in position, the next garment which should be placed upon the baby is a short undershirt. This is often made of cotton, but it is better that it should be woven and similar to the undershirts of adults in all respects, except that it should button down the whole front, rather than be drawn over the shoulders.

The shirt is followed by a garment known as the pinning blanket, which, as ordinarily made, consists of a large piece of flannel slightly gathered at one end and attached to a strip of cotton. If this form of pinner has been provided, the cotton strip should be wrapped around the chest and secured by safety pins. The flannel skirt will then be rolled several times around the limbs and will project far below them. Its end should be turned over and secured to itself opposite the knees of the infant by a large safety pin. This garment may, however, be better replaced by one made wholly of flannel, and, in winter, furnished with sleeves; which buttons up the back, and is attached to a long skirt that is not slit up, as is the old-fashioned pinner. Before the bottom of the pinning blanket, or its substitute, is turned up and fastened, the diaper should be adjusted. This is a large napkin which must be folded into a triangular shape and placed under the sacrum of the infant, with its long side uppermost. It is then folded around the body so that the upper corners meet in front of the pubes; the third corner is then brought up between the thighs, and the three are fastened together by a large safety pin.

The shirt is frequently furnished with a small flap attached to its bottom in the median line at the front, and, if this is found, it should be included by the pin which holds the diaper. One or more cotton or linen dresses, furnished with long skirts and buttoned up the back, are then placed in position, a light shawl is folded over the shoulders, and the process is complete. Small knitted socks are often provided, but their use is not to be recommended, since if the pin blanket is well adjusted they are entirely unnecessary, and because they can be prevented from falling off only by a band about the ankle, which nurses are apt to tie so tightly as to interfere with the circulation of the foot.

The physician should never neglect to examine the child thoroughly for possible abnormalities, immediately after its delivery, since it is extremely humiliating to him to have his attention called to such a deformity by the mother or family after he has assured them that the child is perfect. He should count the fingers and toes, should insert his little finger into the mouth in search of a cleft palate, and run his eye over the whole surface of the skin for birth-marks; these being the only abnormalities which would otherwise be likely to escape his attention.

At the conclusion of the case, any instruments which have been used should be at once washed in warm soap and water, thoroughly dried, and returned to the bag, of course at a distance from the patient; and the physician's last duty before leaving the house is to make a final inspection of the patient, to take the pulse, and see that the uterus is firmly contracted.

CHAPTER IX.

DELAYED LABOR.

GENERAL PRINCIPLES OF THE MANAGEMENT OF DIFFICULT OR DELAYED LABOR IN THE ANTERIOR POSITIONS OF VERTEX PRESENTATIONS.

THE prominence which is necessarily accorded, during the study of obstetrics, to the management of malpresentations and abnormalities is apt to obscure to the mind of the beginner the fact that the majority of obstetric operations are performed for the relief of delayed labor in head presentations. Important as it is that any physician who proposes to engage in the practice of obstetrics should be equipped with a thorough knowledge of the abnormalities which he is likely to meet, the first essential to the management of difficult cases is a thorough comprehension of the conditions which indicate interference in any case. The management of abnormal cases, though complicated by the additional indications furnished by the pathological condition present, rests primarily upon the same general principles as the management of delayed labor; success in the management of abnormalities is, moreover, essentially dependent upon a clear comprehension of the general indications for operation, which are common both to abnormal conditions and to delayed normal labor. It is therefore proper that the subject of delayed labor in anterior positions of the vertex should succeed that of normal labor under the same conditions: and this the more especially since the maintenance of an attitude of watchfulness against the occurrence of delay or arrest is perhaps the most important of the physician's duties during normal labor.

When labor progresses rapidly and normally the duties of the attendant are limited to encouraging and cheering the patient, the relief of pain, the preservation of the perineum, the expression of the placenta, the prevention of post-partum hæmorrhage, and a supervision of the subsequent arrangements for the patient's comfort.

If it could ever be known in advance that the progress of labor in a given case would be entirely normal and satisfactory, nothing more than this could be required of the obstetrician; but since such knowledge is always impossible, and the most promising of cases may at any time turn out badly as the result of non-observation or neglect of some at first trifling abnormality, a far more important duty than any of these is always incumbent upon the accoucheur. His most serious obligation in the care of labor is the maintenance of an attitude of watchful supervision, which will enable him to detect and control the slightest deviations from the normal standard. In other words, by far the most important duty of the obstetrician is prophylaxis.

Two classes of complications may be expected in any case—first, those which belong to the mechanical, or organic pathology of labor; and, second, the disturbances of function which result from a want of power on the part of the mother or from disproportion between the size of the child and the maternal passages, in otherwise normal labors. The latter class of cases are commonly grouped together under the title of difficult or delayed labor, and comprise the subjects which immediately interest us, while the description of the various malpresentations, and other pathological conditions, must be postponed for separate consideration.

DEFINITION OF NORMAL LABOR.—It must be remembered that both the forces of expulsion and those of resistance vary widely, and independently of each other, in different cases, and that arrest may be due either to the presence of an over-firm resistance, in opposition to normal contractions of the uterus, or to feebleness of the expulsive efforts when confronted by no more than normal resistance. Normal labor may, then, be defined as occurring only when the contractions of the given uterus are sufficiently strong to deliver the individual head; and in any case the probability of an ultimate delivery by the forces of nature before exhaustion sets in must be decided by balancing the amount of work already done and the amount of exhaustion already present, against the amount of progress which is still necessary before delivery can occur.

DEFINITION OF DELAYED LABOR.—Delayed labor may be defined as occurring whenever, in any stage of the process of parturition, a considerable period elapses without marked progress, or when the signs of exhaustion of mother or child appear; but the amount of time that must be wasted to constitute delay and cause exhaustion varies widely with the strength of the patient and the stage of labor at which it occurs.

During the first stage, and in the presence of but slight and infrequent pains, many hours may pass without increase of dilatation and without producing any ill results. Upon the other hand, in the second stage of labor the entire absence of progress for even a single hour is highly suggestive of the presence of exhaustion of the uterus, or of some efficient obstacle.

When, then, in any stage of labor, a previously good rate of progress begins to decrease, it is the duty of the obstetrician to keep a constant and most close watch over the condition of the mother and child, in order to detect the first signs of the approaching exhaustion of either patient.

EXHAUSTION OF THE FŒTUS.—The condition of the fœtus can be ascertained only by auscultation of its heart sounds, but these, fortunately, furnish an extremely reliable guide. Under normal circumstances its heart beats increase slightly in frequency during each contraction of the uterus, for which reason the physician's observation of them should be limited to the intervals between pains.

When repeated examinations demonstrate the fact that the fœtal pulse is steadily rising, it may fairly be presumed that its hold on life is becoming precarious; and when, in addition to this increased frequency, a condition of irregularity or intermission of the beats is observed, it may always be concluded that an immediate delivery is necessary to the preservation of the fœtal life.

EXHAUSTION OF THE MOTHER.—The first indication of failure of the mother's strength is also furnished by a steady increase in the rapidity of her pulse at each successive examination, and this is soon followed by a rise of temperature, after which some alteration in the rhythm of the pains is usually to be expected and is a sign that the uterus itself is becoming exhausted. A state of despondency, irritability, and great nervous excitement, though less important, is also a factor to be remembered in estimating the maternal condition.

UTERINE EXHAUSTION: ANNULAR CONSTRICTIONS: RETRACTION RINGS: GENERAL RETRACTION.—If labor is allowed to persist for any great length of time after the general powers of the mother begin to fail it is almost certain to result in the production of a tonic annular spasm of the uterus (a constriction ring), which practically puts an end to all hope of relief by the natural powers. Long-continued and ineffective labor, in opposition to an efficient obstacle, also necessarily results, in the end, in the production of a tonic rigidity of the uterus from premature retraction of its walls, and the formation of Bandl's retraction ring.

After the complete escape of the waters these two conditions may be combined in a general contraction of the whole uterus, *i.e.*, a close application of its whole surface to the surface of the child.

The existence of any one of these conditions is an absolute indication for an immediate operative delivery; and since the presence of any one of them greatly increases both the dangers and difficulties of any operation which may be proposed, it is a matter of the first importance that the obstetrician should be able to recognize early the approach of uterine rigidity, and should thus be enabled to terminate the labor before it becomes a well-established fact.

Bandl's Ring.—In normal labor, the descent of the child, and the consequent decrease in the size of the uterine contents, is compensated for by a process of rearrangement of the muscular fibres, which is known as retraction, and which results in a decrease in the area, and an increase in the thickness of the uterine wall (Fig. 14).

Throughout labor, each contraction is properly followed by a slight amount of retraction of the uterus as a whole; and when prolonged and abnormal labor is compensated for by the descent of the child, on account of the existence of an arrest of progress, this process of retraction results in an abnormal tension of the uterine wall as a whole. The uterine muscle is made up of two sets of fibres, one longitudinal and the other horizontal or circular, both of which share in the process of retraction; and the complications which may arise vary as one or the other of these sets of fibres is the more prominently responsible for their production.

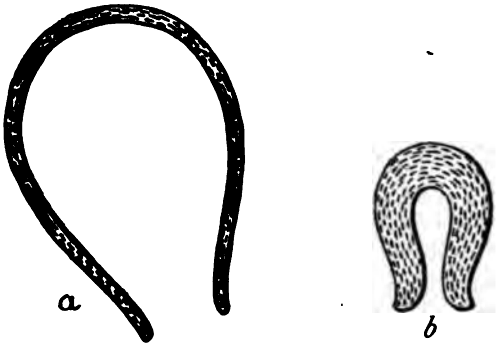

FIG. 14.—RETRACTION OF THE UTERUS. *a*, Unretracted uterus; *b*, retracted uterus.

The true retraction ring of Bandl (Fig. 15), whether we believe that it is situated at the level of the internal os or above it, is, at all events, always due to passive distention and thinning of the less powerful lower portion of the uterus by the active contractions and retraction of the more powerful upper part; it is frequently developed in the presence of a normal or excessive quantity of liquor amnii, and, when seen in a pure state, is due solely to the action of the longitudinal, and not at all to that of the circular, fibres.

It is felt clinically as a mere ridge in the uterine wall, is in no sense a constriction ring, and, like the general retraction of a dry uterus, it is the necessary result of exhaustion of the uterine muscle by a too long continuance of labor in the face of an obstacle.

Constriction Rings.—On the other hand, the spasmodic "hourglass" constriction ring of an irritable and irregularly contracted uterus (Fig. 16), though it may occur, as is sometimes seen, in a uterus with unbroken membranes, is common only after a more or less complete escape of the waters. It is the result of an irritable rather than of an exhausted uterus, and, though it is most common after the uterine muscle has become tired, may occur at a very early stage of labor.

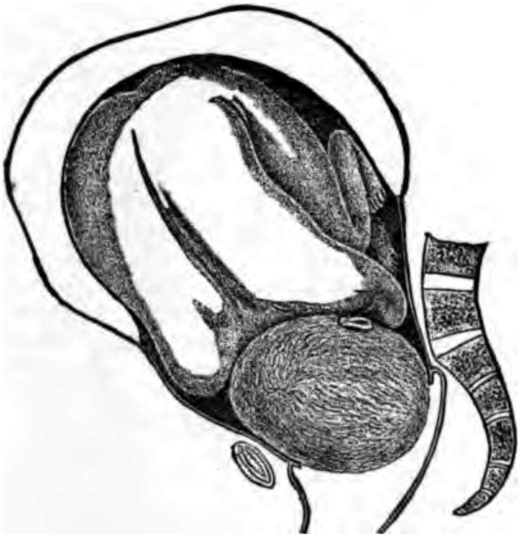

FIG. 15.—BANDL'S RING.

It is due to the action of the circular fibres alone, and is most commonly seen about the neck of the child, but may occur in any horizontal zone of the uterus.

General Retraction.—The general retraction of a dry uterus upon the child leads to a condition in which the uterine wall is rigidly applied to the surface of the child throughout the whole or a greater part of its extent. It is well understood as being the inevitable result of a too early escape of the waters when followed by prolonged and powerful labor in the face of an efficient obstacle, and it is universally admitted that, both from the increased difficulties and dangers of any operation in such cases and because of the impediment which is offered to the placental circulation, labor in a dry uterus should be more closely watched and operated upon more early than when a normal amount of liquor amnii is retained. If present in a marked degree, it is almost always complicated by the coexistence of the retraction ring of Bandl, and, in any degree, is usually accompanied or preceded, especially in head presentations, by one, or several, more or less localized, circular constrictions, or constriction rings.

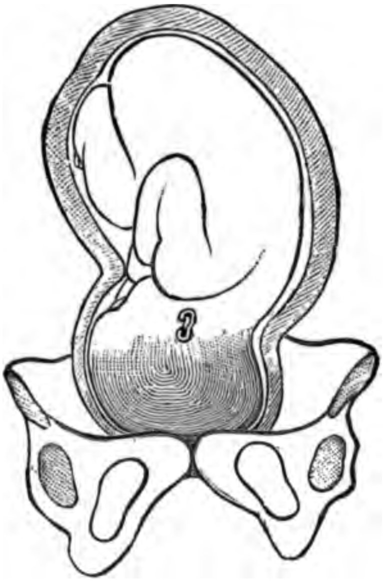

FIG. 16.—CONSTRICTION RING ABOUT THE NECK.

Diagnosis.—The first warning of the approach of these conditions is to be found in the behavior of the pains. Whenever pains which have been strong, regular, and intermittent for some hours, begin to decrease in force and to become tonic or unintermittent, the existence of one or the other form of retraction should be feared; and whenever strong and regular pains begin to be uncertain and irregular, *i.e.*, when they begin to vary greatly in strength and duration, and to occur at irregular intervals, a suspicion of the formation of a constriction ring should be excited.

When the existence of either of these conditions is suspected, the patient should be subjected to a thorough examination, both abdominal and vaginal, and under ether if necessary.

If the general retraction of a dry uterus be present, the close application of the uterine wall to the outlines of the child, and its rigid condition, may usually be appreciated by abdominal palpation.

Bandl's ring can often be felt through the abdominal wall as a linear increase in the thickness of the uterine wall, lying above the brim of the pelvis and parallel to it. It may always be detected by inserting the half-hand into the vagina and cautiously passing a finger between the head and the symphysis pubis along the anterior uterine wall. The ring is then felt as a distinct transverse ridge in the wall of the uterus.

A constriction ring may generally be discovered by a careful abdominal examination, if made with this especial aim in view. If situated about the neck, it may be felt by a digital intra-uterine examination. This examination, however, is an operation in itself, and, as a preliminary, the patient should always be etherized to the point of surgical anæsthesia, in order to secure the greatest possible relaxation of the uterus; it should be conducted only during the intervals of the pains, and never without careful counter-pressure.

That any or all of these conditions may occur after long labor, in the presence of an undilated os, is a fact which must not be overlooked.

Management of Delayed Labor.

The conditions which lead to success in the management of difficult labor are, the attainment of an early and accurate diagnosis of the mechanical relations in the given case, and a correct appreciation of the indications for operation which it presents at the time when they first come into existence.

It is the first axiom of midwifery that the natural forces, when good and efficient, are preferable to the best efforts of the obstetric art; but, unfortunately, in civilized woman nature is not always efficient, and there can be no doubt that, when nature absolutely fails, art must step in. Modern obstetrics, however, aims at more than this; armed with our present knowledge, we ought to be able to foresee evil, to realize in advance that nature is likely to fail in a given case, and to forestall undue exhaustion by an artificial termination of the process which is about to cause it.

It may be said, then, that interference becomes justifiable whenever labor has been so far protracted that the exhaustion likely to follow its further continuance is thought to expose either mother or child to greater risks than are involved in an operative delivery. It is evident, however, that this ratio between the risks of delay and interference must depend not only upon the severity of the operation proposed, but also upon the skill of the individual physician; for it is plain that in a given case the risks of delay may be at once greater than those of an operative delivery in skilful hands, and less than that of the same procedure if done in a bungling manner.

The young obstetrician, whose skill is yet to be acquired, will then act most wisely if he adopt the most conservative of methods, and may readily shun an operation in cases which would properly be fit for interference if under the care of an experienced operator. He should accustom himself to endure the tedium of protracted labor until distinct evidence of an approaching exhaustion of the patient is forced upon his observation; but if a given operation is eventually to become necessary, it is far better that it should be undertaken before the strength of the mother has become exhausted by protracted, unavailing efforts, and before the vitality of the child has been lowered by an unduly long exposure to the pressure of the contracting uterus.

Exhaustion as an Indication for Operation.—When the signs of either of the three forms of exhaustion appear, the necessity for operative interference is to be estimated by comparing the amount of exhaustion present with the amount of work which still remains to be done and the degree to which progress is already failing, and then attempting to form an opinion upon the probability of the occurrence of natural delivery before more serious exhaustion appears.

It is apparent that when a given degree of exhaustion makes its appearance early in labor,—that is, when a large amount of work remains to be done,—its significance as an indication for operation is much greater than at a late stage of labor, when even somewhat exhausted maternal powers may enable the patient to endure the small amount of exertion which is still necessary, without injurious results.

The failure of progress is to be estimated by observing the amount of dilatation of the os, or, in the second stage, the height of the head, by frequently repeated vaginal examinations; and by the growing size and firmness of the caput succedaneum, which, from the mechanical necessities of the case, furnishes the most reliable information obtainable as to the amount of force which has been necessary to accomplish the degree of progress that has already been made. It may be said in general that the presence of a large and increasing caput, in combination with a failure of advance, is almost infallible evidence that operative interference will sooner or later become necessary, and that this should consequently be undertaken as soon as either patient begins to show any signs of exhaustion

Delayed First Stage.

It was long held as one of the first rules of midwifery that no danger need be apprehended to either mother or child from undue prolongation of the first stage; but in point of fact nothing in obstetrics presents more serious difficulties than the management of protracted first stages. Many of the most serious of the obstructive difficulties of labor are habitually masked by an apparent prolongation of the first stage, which is due to the fact that after rupture of the membranes the head in such cases is unable to exercise any effective pressure against the os. Should the membranes in such a case rupture early, the os necessarily fails to dilate, and, even if their rupture is delayed, the absence of any pressure against the cervix, and the compression of the lower uterine segment between the head and the pelvic brim, usually result in the production of a spasmodic constriction of the os which is extremely likely to be mistaken for a simple rigidity of its tissues.

Delay in the first stage of labor is evidenced by the absence of progress in the dilatation of the os.

It may be due to a weakness of the contractions, *i.e.*, to uterine inertia; to a pathological rigidity of the tissues of the cervix; or, if the membranes have ruptured, to the existence of some mechanical obstruction which prevents the dilating wedge from exerting an effective pressure against the os.

Inertia Uteri.—This state of inertia, or simple uterine atony, is most frequently seen in women who have borne many children in rapid succession; it may be primary and due to a defective supply of muscular fibres in the uterine wall, or, when it follows some hours of good labor, is, in effect, a period of rest for the over-tired muscles, and is, in either case, commonly succeeded, after a longer or shorter interval, by a period of renewed uterine activity, which usually results in a prompt termination of the labor. The appearance of comparative inertia after a period of good labor is always highly suggestive of the supervention of uterine rigidity, although this is not a necessary sequence of events. The two conditions are to be differentiated by the existence, in inertia, of complete relaxation between the pains.

Rigidity of the Os.—When delay in dilatation occurs in the presence of good pains it may be either due to a rigidity of the tissues of the cervix which is sufficient to afford an abnormal degree of resistance to the efforts of the uterus muscle, or to the fact that the mechanical relations are such that the dilating wedge fails to exert a sufficient amount of pressure against the os.

A pathological rigidity of the tissues of the cervix does, without doubt, sometimes exist, but it is extremely rare. It is to be differentiated from a spasm of the cervix, by the persistence of uterine tension when the patient is fully anæsthetized, and from the existence of adhesions between the membranes and cervix; deficient pouching of the membranes; or failure of the head to exert pressure against the os after the rupture of the membranes.

Diagnosis of the Cause of Delay.—The diagnosis between pathological rigidity of the cervix and the other conditions mentioned can only be made by a high examination under full surgical anæsthesia; the diagnosis between inertia and rigidity of the uterus sometimes necessitates the same precaution; and the dangers which follow the neglect of high arrest from any cause are so great that the following may be laid down as an imperative rule: When fair labor has been present for from fifteen to eighteen hours without proper dilatation of the os, or when thoroughly good uterine contractions have been endured for from five to six hours without effecting an increase of dilatation which corresponds to their strength, the patient should be etherized and subjected to a digital intra-uterine examination, even though no signs of exhaustion are as yet present.

In making this examination the half, or the whole hand if necessary, should be inserted into the vagina, and one or two fingers passed to their full length within the os. The diagnosis of presentation and position should be fully verified, the pelvis should be measured, and the relative size of the head and pelvis should be carefully estimated, by observing whether the greatest diameter of the head is markedly larger than that which already occupies the brim.

Such an examination, though distinctly an operative procedure, is attended by but slight, if any, risk to the mother, provided that it is conducted with the greatest gentleness and under full anæsthesia, and it may not infrequently establish early in labor the existence of a malpresentation or other obstacle, which at that stage may be rectified by mild measures, but which, if left untreated until after the supervention of uterine rigidity, would perhaps necessitate a severe operation.

TREATMENT OF DELAY IN THE FIRST STAGE: *Inertia Uteri.*—If delay is due to inertia, it is important that the patient should be cheered and encouraged, and that her strength should be supplemented, if necessary, by the moderate administration of stimulants, since inertia is often, in part, the result of mere despondency and nervous fatigue, and disappears with the return of cheerfulness and hope. In some few cases much may be gained by the application of manual friction to the fundus. This should consist in a gentle circulatory movement of the hand over the upper part of the uterus; with the appearance of a pain it should be increased to the maximum of rapidity and force which is not often productive of any serious amount of pain or discomfort to the patient, and with the disappearance of the pain should be again decreased; to be efficient it must be persisted in through many successive pains. Much may also be effected by gentle stretching of the os with two fingers at the beginning of each pain; but this must be regarded rather as a means of exciting uterine contractions than as a manual dilatation of the os, and must be consequently restricted to the least possible amount of force; any unnecessary rubbing or tension upon the margin of the os should be carefully avoided, as liable to result in laceration.

Inertia is often dependent upon the presence of a full bladder, which, by its own distention, decreases the ability of the uterus to contract, through their close and extensive anatomical connection. This distention, moreover, also exerts a still more important effect by reflex nervous influences. As a consequence of this relation the first step in the treatment of inertia uteri should invariably be the passage of the catheter and a complete evacuation of the bladder.

If the os is nearly dilated when inertia supervenes, and is so soft and elastic as to be wholly dilatable, high rupture of the membranes with the catheter may be followed by the production of vigorous labor. In exceptional cases inertia may resist all these measures for so long a time that the signs of exhaustion appear as a mere result of the endurance of pain and of nervous tension; and in these rare cases it may be necessary to resort to manual dilatation and version, or to the high use of forceps, for the relief of simple inertia.

Ergot in Inertia.—The use of ergot as a substitute for the forceps in the treatment of relative or complete inertia is still so widely popular that it must not be passed over without mention. The physiological action of ergot is the production of a tonic contraction of the whole uterine muscle, cervical as well as corporeal. Its effect in the expedition of labor is extremely uncertain, since in the majority of cases it produces a contraction of the cervix which is sufficiently strong to resist the force of the ergotine contraction of the fundus; and in such an event the tonicity of the contraction almost invariably results in the death of the fœtus by arrest of the placental circulation, unless operative interference is immediately resorted to. Although it is occasionally promptly successful, this happy result is so rare, and the dangers which attend its use are so much greater than those which follow the employment of forceps, that the free use of ergot while any portion of the ovum remains within the uterine cavity is unhesitatingly condemned by all modern authorities, at least in labor at term or during the last three months of gestation.

Some high authorities permit themselves to administer extremely small (ten-minim) doses of the fluid extract of ergot at intervals of twenty minutes in cases of simple uterine inertia in which the os is practically dilated, and where they feel certain that the rapid delivery of the child is prevented by nothing but the absence of vigorous contractions; but all agree that its use must be followed by the maintenance of an extremely careful watch upon the fœtal heart, and that the obstetrician must hold himself in readiness to apply forceps without delay if any indication of an alteration of its heart-beat occurs.

Although the guarded use of ergot in this manner may, in a few selected cases, be allowable to experts, the danger of an erroneous diagnosis of the cause of delay is so extremely great, that the accoucheur who permits himself to employ it assumes a far greater responsibility than is involved in the application of high forceps to an easy case; while the reckless use of this drug, which is still extremely common, is a relic of more ignorant times which must be unhesitatingly condemned.

Rigidity of the Cervix.—Rigidity of the cervical tissues may be due either to an over-development or an over-activity of their muscular elements, or to the existence of an organic alteration of their substance, *i.e.*, a stenosis. If no mechanical obstacle is detected by an examination under ether, and if the rigidity of the os disappears, to be re-established after the recovery of the patient from anæsthesia, the failure of progress is probably due to a muscular spasm of the circular fibres of the cervix and a consequent undue resistance to the efforts of the dilating wedge. This condition is almost uniformly overcome by the administration of chloral in fifteen- to twenty-grain doses, repeated at twenty-minute intervals to a maximum of fifty grains, or by the obstetric use of ether described under Normal Labor.

If no mechanical cause for the arrest is discovered, and if the rigidity of the os does not disappear under full surgical anæsthesia, it may be admitted that true rigidity of the cervix is present. This, when recognized, may usually be overcome by gentle manual dilatation, which in such cases need not be carried to the degree of complete expansion, since a very moderate stretching often produces a change of condition, which permits dilatation to progress under the force of nature.

Malpresentations, etc.—If a malpresentation is found it should be rectified at once if possible, since its persistence untreated must necessarily lead to the supervention of retraction or of a spasmodic rigidity of the uterus. If the delay proves to be due to a disproportion between the size of the head and the pelvis the obstetrician should be stimulated to the closest possible observation of the progress of labor, in order to be ready to operate, if that should prove to be necessary, before the appearance of any serious degree of exhaustion.

In general, it may be said that, when the question of operation arises during the first stage, the conditions which should incline one toward a conservative policy are, a small size of the os, rigidity of the cervix and other soft tissues, a satisfactory condition of the pains, and the fact that fairly good, if not satisfactory, progress is still present; while absolute arrest in the presence of a large and increasing caput, full dilatation or dilatability of the cervix, an elastic perineum, and rapidly increasing failure of the uterine forces are arguments in favor of the necessity of interference.

DELAYED SECOND STAGE.

The management of delay in the second stage of labor practically resolves itself into the question of the expediency or inexpediency of operative interference at any given minute; and since the risks of delay and interference both decrease in proportion to the amount of descent which has been effected, it is necessary at the start to divide the consideration of delay in the second stage into sub-stages, in accordance with the height of the head in the pelvis.

This is determined by the relation which the greatest diameter of the head bears to the pelvic walls; *i.e.*, according to the zone of the pelvis which is occupied by the girdle of contact between the head and pelvic walls. When the greatest diameter is above the inlet the head is said to be free above the brim; when the greatest diameter occupies the strait itself, the head is said to be engaged at the brim; when the girdle of contact occupies a position between the superior and the inferior straits, the head is in the excavation; when the girdle is found at the inferior strait, the head is low; when the greatest diameter has passed the inferior strait and the perineum is distended by the vertex, the head is said to be on the perineum. Although delivery when the head is in the excavation is more difficult and attended by somewhat greater risks than when it is at the inferior strait or upon the perineum, the difference in risk is so much more greatly altered by the fact that it has or has not passed the brim that it is customary to divide the question into the consideration of high and low operations, the low including all cases in which the greatest diameter is below the superior strait.

In normal pelves, and with occipito-anterior positions of the vertex, delay in the second stage is, as before, due either to relative feebleness of the pains in opposition to a normal adaptation between the head and pelvis, or, upon the other hand, to unduly great resistances in the face of normal uterine forces. In the second case the resistances may be increased, either by abnormal rigidity of the soft tissues of the mother, or by undue size and firmness of the fœtal skull.

INERTIA IN THE SECOND STAGE.—*High Arrest from Inertia.*—The diagnosis of inertia during the second stage of labor is to be made by the exclusion of any obstructive elements in the case on high examination, under ether if necessary, and by the fact that the feebleness of the contractions has existed from the start. When delay, high, is due to relative inertia of the uterus, the expedients recommended for the treatment of inertia in the first stage should be given a fair trial; but since the dangers of interference are considerably decreased by the disappearance of the cervix, and because operations undertaken for the relief of mere inertia with no more than normal resistances are uniformly easy, it is ordinarily proper to resort to an operative delivery whenever there has been an absence of progress of from three to four hours' duration, or at the least indication of failure in the powers of mother or child.

When the operative delivery of a normal head, arrested by simple inertia at the brim of a normal pelvis, has been decided upon, the choice between forceps and version must depend to some considerable extent upon the preferences of the individual operator and the preponderance of skill which he has acquired in one or the other operation. Easy forceps operations, however, if performed with a reasonable degree of adroitness, should involve but little risk to mother or child, while the life of the child may occasionally be lost in the most simple versions by premature compression of the cord or by some difficulty in the extraction of the arms, for which reason the preference should usually be given to forceps in this class of cases. The relative indication for forceps over version increases with the firmness of the perineum and other soft parts, and is of course more marked in primiparæ than in multiparæ.

Low Arrest from Inertia.—When the contractions have been sufficiently powerful to effect the descent of the head into the excavation, but die away and are succeeded by an absence of progress at the inferior strait, the risks of the performance of a probably easy low-forceps operation are so small that it is usually proper to complete the delivery by instrumental means, after an hour has passed without any increase in the descent. Such action is justifiable, not only on the ground of humanity to the mother, but because it is found by experience that, although it may result in a slightly increased number of lacerations of the perineum, it decidedly decreases the percentage of still-born children.

HIGH ARREST FROM INCREASED RESISTANCES.—When at any time after the effacement of the cervix the high head has failed to make any advance during a full hour of strong labor, it is good practice to pass the half-hand into the vagina, under ether if necessary, and thus enable one or two fingers to penetrate sufficiently high to make an accurate and complete examination of the position and relations which the head as a whole bears to the pelvis. If such an examination demonstrates the absence of any abnormal conditions, and establishes the fact that the delay is due solely to the unusual size and firmness of the head, it is proper to definitely lay aside all thoughts of operative interference until it is indicated by the actual or impending exhaustion of one or the other patient. It frequently happens that a head which was at the start, to all appearances, so disproportioned to the pelvis as to afford but little reasonable hope of its delivery by the uterine efforts alone, becomes so greatly modified during a few hours of strong labor as to pass the brim under the force of nature only, before the powers of either patient fail. It is, moreover, a well-established fact that the moulding of prolonged labor is far better borne by the child than is an immediate and forcible reduction of the bulk of its head during a rapid instrumental extraction. Such delay is, however, always sufficient cause for anxiety, and should excite the obstetrician to the maintenance of an unusually close watch for the appearance of maternal, uterine, or fœtal exhaustion. When the fœtal heart or maternal pulse begins to rise steadily, or when previously regular and intermittent pains become irregular and tonic, it may be taken for granted that the delivery of a living child by natural labor has become improbable.

When the fœtal heart-beat permanently increases in rapidity it is important that the child should be promptly delivered; since, if operation is delayed, it must, not improbably, be eventually undertaken at a time when the vitality of the child has become distinctly less, and when its chances of survival are therefore much decreased, and because it may be taken as an axiom in midwifery that, though the preservation of the maternal soft parts is an object of the first importance, it is always inferior in value to the fœtal life. When the maternal pulse and temperature are steadily rising, an operation is indicated in the interests of both patients; since it is unlikely that powers which have begun to flag before the head has passed the superior strait will be sufficient to perform the large amount of work which still remains to be done, and if an operative delivery is to be necessary it is far better that it should be performed while both patients are in comparatively good condition. Moreover, when the general strength of the mother has once failed it is highly improbable that the uterus will long remain in a normal condition; and, as a matter of clinical experience, an increase in the maternal pulse and temperature is almost invariably followed, after a short interval, by the appearance of an irregularity or tonicity of the uterine contractions which is highly diagnostic of the appearance of premature retraction of the uterus.

Choice between Forceps and Version in High Arrest from Increased Resistances.—The discussion of the relative advantages of version and the forceps in each of the many cases in which a high operation is indicated is one that in itself might fill a volume, and the choice is, moreover, one which must, after all, be decided in most cases by the skill and predilections of the individual operator, and by careful balancing of the conditions of the individual case. All that can be attempted here is to describe briefly the conditions which are favorable or unfavorable to one or the other operation.

In anterior positions of uncomplicated vertex presentations, in normal pelves, the choice depends on the degree of engagement which has already been effected, and on the condition of the uterus and soft parts.

Fixation of the Head.—If the head has become fixed at the brim the application of forceps is comparatively easy, while the introduction of the hand for version is more difficult than with a free and movable head. A free head is therefore favorable to version, and a fixed head to forceps. If at the time of operation the greatest diameter of the head is already in, or nearly in, the superior strait, the greater part of the resistance to the passage of the forecoming head has been already overcome; and the head is, moreover, in all probability so far moulded to the position in which it finds itself, that its rapid alteration during extraction, to the configuration necessary for the passage of the after-coming head will expose the child to grave risks of intracranial injury. This condition is therefore a strong indication for the use of forceps rather than version.

Constriction Ring.—When a dry uterus has retracted upon the child, or a constriction ring is present, the use of forceps is far less difficult and dangerous than version.

Bandl's Ring.—When Bandl's ring occurs in the presence of an undiminished quantity of waters, and in a pure state, forceps should be preferred, unless the child is very freely movable and the head but lightly engaged; if it is complicated by the presence of a constriction ring, version is rarely safe, or even possible.

Rigid Soft Parts.—If the cervix or vagina is small and rigid, the use of the forceps permits of their gradual dilatation during the slow advance of the head, while the rapid extraction which is necessary in the delivery of the after-coming head exposes them to much greater risk of serious laceration.

The importance of each of these conditions in the individual case should be carefully estimated before the decision is made; but it should be remembered that while the performance of version renders a subsequent resort to forceps impossible, a previous tentative application of forceps is no hindrance to the subsequent performance of version. The careful and skilful application of forceps, and the use of gentle traction to determine the probability of so effecting the descent of the head, should be attended by little or no risk to either mother or child. The introduction of axis-traction has greatly widened the field for instrumental delivery.

LOW ARREST FROM INCREASED RESISTANCES.—When the uterine contractions have been sufficiently powerful to effect the passage of the superior strait, but are unable to overcome the resistances of the inferior strait and of the soft tissues of the pelvic outlet, the only conservative operation possible is the application of forceps. The risks of this low operation, even when performed for over-tight adaptation, are comparatively so small that it may be properly undertaken, not only on the appearance of the least perceptible amount of exhaustion on the part of either patient, but as a matter of routine whenever the second stage has already consumed two hours and progress has been absent for one hour.

DELAYED THIRD STAGE.

Delay in the expulsion of the placenta may be due to complete or partial atony of the uterus; to the presence of a spasmodic closure of the internal os, or of a spasmodic constriction ring in some other portion of the uterus; and, finally, to the existence of morbid adhesions between the placenta and the uterine surface.

Inaction of the uterus is usually attended by the appearance of post-partum hemorrhage, and the immediate removal of the placenta is then essential to its arrest; if the relaxation of the uterine muscle is not followed by this complication, it may be endured without injury for prolonged periods of time; but it should be an invariable rule that the uterus should be closely guarded by the hand of the obstetrician, or by a trained assistant, during the whole period which intervenes between the delivery of the child and the expulsion of the placenta. The danger of the occurrence of hæmorrhage in such a condition of uterine relaxation is, moreover, so great that if, at the end of an hour spent in attempts to excite uterine contractions and express the placenta, all efforts to this end have been unavailing it is usually better to remove the secundines manually.

The presence of spasmodic constriction or of abnormal adhesions of the placenta is to be diagnosed mainly by the failure of Credé's method of expression, when systematically and perseveringly applied by an experienced hand. When the uterus responds promptly to the hand, an expert operator may occasionally be justified in manual removal of the placenta after the failure of a comparatively small number of efforts at expression; but the best rule for the young accoucheur is that gentle efforts at expression should be persevered in for at least an hour before the hand is allowed to invade the uterus in search of the placenta.

If expression fails, the fingers of the half-hand should be inserted into the vagina and passed into the cervix, in an attempt to reach the lower edge of the placenta, when this can be drawn into the os. Gentle traction upon its substance, in combination with expression from above, will sometimes supply sufficient force to release it from a spasmodic ring, or may even separate slight adhesions; but there is so much danger of laceration of its substance, and of the retention of portions of the placenta or membranes, after the use of this method, that none but the most gentle tractions should be allowed.

If this fails, and the immediate removal of the placenta is warranted by the presence of hæmorrhage, or by prolonged retention, the fingers should be formed into a cone, should be passed gradually and without force into the uterus, and carried to the fundus, if possible between the membranes and the uterine wall, upon the side opposite to the placenta. They should then be swept across the fundus until they reach the edge of the placenta, when, if no pathological adhesions are present, the entire after-birth may usually be swept into the world in advance of the hand; if, however, its surface is adherent to the uterus, the adhesions must be divided by gentle sawing and scraping motions of the fingers, care being taken that they are so directed that any laceration which may occur shall be at the expense of the placenta, and not of the uterine wall. The tissues of the placenta may be distinguished from those of the uterus by their greater softness and their lack of contractability when excited by the pressure of the fingers. Should the adhesions be extensive and the separation difficult, the risks of the retention of small fragments of the placenta in utero are decidedly less than those which attend upon unnecessary wounding of the intra-uterine surface, since such fragments are usually cast off with the lochia, and fail to cause any symptoms of importance if full antiseptic precautions have been observed.

The manual removal of the placenta should invariably be followed by an antiseptic intra-uterine douche, since the introduction of the whole hand and the use of the finger-nails in inflicting fresh wounds upon the uterine surface makes the operation the most dangerous of obstetric manipulations, in so far as the production of sepsis is concerned.

In the majority of cases in which manual removal of the placenta is necessary, the elasticity of the perineum is so much increased, and its sensibility is so much diminished by the distention due to the delivery of the child, that tolerably resolute women are able to endure the pain of the operation without anæsthesia. In cases in which the pain is extreme the administration of ether or chloroform is usually permissible; but its use should not be pushed to any unnecessary degree, on account of the increased liability to relaxation of the uterus and post-partum hæmorrhage, which probably attends its employment during this stage of labor.

PART III.—OBSTETRIC SURGERY.

CHAPTER X.

PREPARATIONS FOR LABOR. ARTIFICIAL DILATATION OF THE OS. THE INDUCTION OF ABORTION, MISCARRIAGE, AND PREMATURE LABOR.

PREPARATIONS FOR OPERATION.

ANTISEPSIS.—Obligatory as is the observance of strict antiseptic precautions in all cases of normal labor, this necessity is even more imperative when operative procedures are contemplated. No added precautions are, however, necessary, except a careful disinfection of any instrument which is to be used, and the use of a thorough vaginal douche as a preliminary to any operation; since the introduction of a clean hand or instrument through anything but an equally clean vagina is manifestly unscientific and unlikely to exclude septicæmia.

Disinfection of Instruments.—This may be effected by their immersion in corrosive sublimate or carbolic acid solutions, by boiling, or by exposure to dry heat. Corrosive sublimate, though a most efficient antiseptic, corrodes metallic instruments, but those which have been well nickelled are so slightly affected that their polish can be restored with but little effort. Carbolic acid, in the proportion of one part of the acid to twenty of water, is however, an efficient germicide, and, if at hand, should be preferred, since its action upon metal is extremely slight; the instruments should, however, be left in the solution for at least ten minutes before being used. Dry heat is seldom easily attained, and possesses the disadvantage that it is efficient only at temperatures which are more or less injurious to the temper of steel instruments. Soft catheters and forceps with wooden handles are injured by boiling; but if the forceps are provided with handles of metal or hard-rubber there can be no more efficient or convenient method of sterilization than their immersion in boiling water for from twenty minutes to half an hour; and this is the only method which can be relied upon in the disinfection of more complicated instruments. Whichever method is used, it must not be forgotten that ordinary, or macroscopic, cleanliness is an essential preliminary to proper disinfection. Catheters should not only be immersed in the disinfectant solution, but care should be taken to see that the fluid has access to the interior as well as the outside of the tube; and it is well to rinse the instrument in simple water before passing it into the bladder, since the strong disinfectants are sometimes capable of exciting cystitis by merely chemical irritation.

ANÆSTHESIA.—The use of anæsthetics during obstetrical operations is in this country so nearly universal that any extended discussion of the propriety of their use is unnecessary. The advantages of anæsthesia are twofold—first, the avoidance of pain and anxiety, and the accompanying nervous exhaustion of the patient; and, second, the diminished or abolished danger of abrupt movements, at inconvenient moments, which results from their use. During delivery by forceps the obliteration of the uterine pains is sometimes a disadvantage, but during other operations it is almost uniformly to be desired. It must, however, be remembered in this connection that if anæsthesia is used at all it must always be carried to the fullest surgical degree, since partial loss of consciousness not only fails to annul pain, but deprives the patient of her normal self-control, and renders the occurrence of dangerously abrupt movements almost a certainty.

The choice of anæsthetics is practically restricted to chloroform and ether. It is generally admitted that the dangers of chloroform are far less in midwifery than in its surgical use; but this absence of risk, though relatively great, is by no means absolute, and the advantages of ether for prolonged administration are very real; while the greater care which must be exercised in the administration of chloroform, and the possibility of intrusting the ether sponge to an untrained assistant during normal labor or minor operations, are so great a convenience as perhaps to turn the scale, and this especially since the patient's perception of the discomforts of the first stage of etherization are distinctly lessened by the distraction of her attention due to the presence of the pains of labor, so that it is often possible to carry its administration to complete anæsthesia without the provocation of any marked symptoms of discomfort. The most certain method of effecting this very desirable end is to intrust the sponge at first to the hands of the patient, in the manner recommended for the alleviation of pain during normal labor, and then gradually increase the dose until consciousness is insensibly lost. It is probable that the physiological effect of either anæsthetic is so far antagonized by the presence of the pains of labor that the dose necessary for complete anæsthesia is considerably in excess of that which would be required by the same patient in the absence of pain; and it is certainly often observed that a patient who has failed to attain complete anæsthesia during the process of delivery sinks into profound unconsciousness as soon as the pain has been annulled by the escape of the child; a fact which, though ordinarily unproductive of evil, should never be forgotten during the administration of ether to patients with feeble constitutions or weak hearts.

POSITION OF THE PATIENT.—The attitude in which the patient is placed varies with the nationality of the operator; in England, the lateral decubitus is still preferred; but on the continent of Europe, and in America, the lithotomy position, with the patient lying across the bed, the hips well over its edge, and each leg held by an assistant, is almost uniformly chosen; and its adoption will always be assumed here unless some statement is made to the contrary.

The physician should always remember to protect the edge of the bed by drawing the rubber sheet well over it, and to lay a number of old rugs or comforters on the carpet underneath it, in order to prevent soiling by either liquor amnii or blood. The provision of hot and cold water, ice, ergot, brandy, etc., already recommended for normal labor, is of course of especial importance in operative cases.

CATHETERIZATION.—All obstetrical operations should invariably be preceded by an evacuation of the rectum and bladder; the administration of an enema of soap and water is sufficient for the one, but the use of the catheter during childbirth sometimes presents some little difficulty, and must be described in detail. The abundance of the vaginal secretions during labor and the puerperium makes it difficult to pass the cathether by touch without introducing into the bladder some portion of the vaginal secretions—an accident which is almost invariably followed by the production of cystitis; for which reason, the catheter, in obstetrical work, should always be passed under the guidance of the eye.

The form of instrument which should be used is by no means unimportant; during the puerperium, soft rubber catheters, or those made of woven raw silk, are unobjectionable and distinctly the least disagreeable to the patient; but during labor short female catheters and all soft instruments are mere abominations, whose use should never be permitted, the only instruments fit for use at this time being the silver, or stiff English webbing, male catheters, of medium size, *i.e.*, 20 to 25 French, 8 to 12 English.

The labia should be separated, and the neighborhood of the meatus carefully cleansed with a corrosive-sublimate solution.[1]

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[1] The normal prolapse of the anterior vaginal wall during labor sometimes hides the meatus at the bottom of a fold, but it can always be found by following the median line backward from the clitoris.

The tip of the catheter should then be slipped into the meatus, and the forefinger of one hand should be passed into the vagina, and should watch the passage of the instrument along the posterior surface of the pubic wall to its point of contact with the head. In some cases no obstacle is encountered here, but in the majority of instances, the passage of the catheter into the bladder is greatly facilitated by making moderate pressure upward and backward upon the presenting part. The entrance of the instrument into the bladder is signalized by the escape of a jet of urine; but it is essential to success that its progress should not be arrested here. If a rigid instrument is used it should be passed on until the operator ascertains by his tactile sense that its tip has reached the highest point of the bladder, stretched as that viscus is to an extreme height in the abdomen, by its attachment to the anterior wall of the distended uterus; but if the much preferable English webbing catheter is employed the stylet should be withdrawn as soon as the instrument is within the bladder, and the catheter itself should then be pushed in until its hilt is at the meatus. If in this position no urine comes, the instrument should be gradually withdrawn until the flow is observed to start, held in position until this ceases, and again withdrawn gradually, when a further flow is usually observed. This process is to be repeated until the catheter has been entirely withdrawn.

Too great care cannot be exercised in the evacuation of the bladder, since, if even a small quantity of urine has been left behind, it may during the subsequent manipulations of delivery settle into the lower portion of the bladder, which may then, by prolapse of the anterior vaginal wall, form a sac below the head, and if such a sac is formed it is almost certain to be caught between the advancing occiput and the pubic wall, when, its connection with the urethra being cut off, the force of delivery is not unlikely to result in the production of that most annoying of all obstetrical accidents, the formation of a vesico-vaginal fistula.

ARTIFICIAL DILATATION OF THE OS.

The delivery of the child, whether effected by art or by the natural forces, presupposes the existence of complete or nearly complete dilatation or dilatability of the os; but, since it may exceptionally be necessary to perform any operation in the presence of a partly dilated cervix, we may be obliged to precede any of them by the preliminary operation of its dilatation. It is therefore proper to open the discussion of operative obstetrics by a description of the methods which should be employed for this purpose.

Two methods are at our disposal—the use of Barnes's dilating bags, and of the intelligent efforts of the human hand. The English obstetricians, following the example of the illustrious inventor of the dilators, are little prone to manual dilatation; but in Germany and America the many provoking annoyances and the frequent failures of Barnes's bags, in comparison with the certainty and efficiency of manual dilatation, have led to the abandonment of their use, unless in exceptional cases.

BARNES'S HYDROSTATIC DILATORS.—If the dilating bags are used, the tip of a uterine sound should be inserted into the pocket on the side of the smallest bag, which should then be folded around the sound, thoroughly greased, and passed into the cervix until its waist is grasped by the os. It should then be held in position by a pair of forceps and distended with a weak solution of corrosive sublimate until the os has been raised to as high a degree of tension as is judged wise; it is then left *in situ* until expelled by the contractions of the uterus, when the same process is repeated with the next larger bag. The objections to their use are that they can but seldom be used until a certain degree of dilatation is already present; that when the subsequent failure of dilatation is due to inefficiency of the pains they frequently fail to excite contractions which are sufficiently strong to secure dilatation; and that, on the other hand, when the delay is due to rigidity of the os in the presence of good labor, the bag will not infrequently rupture, without effecting dilatation. Their action is never sufficiently prompt to be of use in a pressing emergency; and, as they are at present made, the largest size fails to raise the os to a degree of dilatation sufficient for the performance of any operation.

MANUAL DILATATION.—The operation of manual dilatation, though easy and often invaluable, is no light procedure, and must even be regarded as among the gravest of obstetrical operations. It not only exposes the patient to increased danger of septic absorption, but, if clumsily performed, is almost certain to result in lacerations of the cervix, or even of the uterus or its vaginal attachments. If used as a preliminary to a forced delivery it adds greatly to the gravity of the other operation proposed. It should never be undertaken without grave consideration, and then only under full surgical anæsthesia and with every convenience which can be afforded by the position of the patient and the presence of competent assistants. In fact, although this operation affords to the skilful obstetrician his most valuable resource for the induction or acceleration of labor, and although its careful performance seldom results in any accident of importance, the occurrence of any clumsiness or the use of undue force during the procedure is attended by such immediate and disastrous consequences that the inexperienced accoucheur should not permit himself to employ it without consultation with some older practitioner, unless in the face of a most pressing emergency.

Everything being in readiness for the performance of the operation, and the dorsal surface of both hands being thoroughly anointed with aseptic vaselin, one hand should be placed upon the fundus of the uterus, and throughout the operation should make downward pressure upon it through the abdominal wall, in order to guard so far as possible against the production of any undue tension upon the vaginal attachments of the uterus; while the fingers of the other hand should be formed into a cone and gently inserted through the vulva until the first joint of the fore-finger can be passed within the os.[1] This finger should then be hooked around its edge, and should exert gentle downward traction, while a cautious effort is made to pass the tip of the second finger beside it (Fig. 17); and this effort should be maintained until the first joints of both fingers are fully within the circle of the os and placed side by side, in which position they present the greatest surface to it.

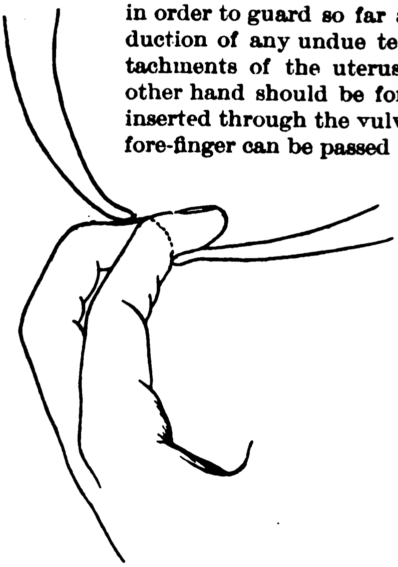

FIG. 17.—INTRODUCTION OF THE SECOND FINGER IN MANUAL DILATATION OF THE OS.

Throughout the performance of this operation it should be remembered that the os uteri is not simply an elastic band, nor capable of distention to any marked degree after the manner of a piece of rubber, but is, on the other hand, living tissue which can be dilated only by the relaxation of the circular fibres of the cervix, and that this relaxation is the result of a gradual muscular fatigue due to their long-continued exertions against the obstacle opposed to their contractions by the presence of the finger. For this reason, so soon as the edge of the os is distinctly subject to even slight tension the motion of the fingers should be arrested, and they should be held firmly *in situ* until the os is felt to relax around them. So soon as this occurs they should be again advanced until the former slight tension is re-established, and then again arrested until relaxation occurs. This process may occupy many minutes, and frequently subjects the hand of the operator to extremely painful muscular cramps, but cannot be hurried, with any proper regard to the safety of the patient. This portion of the operation is by all odds the most difficult and painful to the operator, who rapidly loses all power of controlling the motions of the fingers which are subjected to the uterine pressure. It may occupy from a few minutes to several hours, in all but the easiest cases is so extremely fatiguing as to necessitate a frequent change of hands, and may often prove impossible unless a second operator is present to supply the place of the first and afford him needed rest.

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[1] Should the os resist the entrance of the finger, it may be necessary to trust to the action of a bougie or to resort to the cautious use of steel dilators to effect a preliminary dilatation ; but this is seldom necessary.

It occasionally happens that after the insertion of the first finger the introduction of the second proves almost impossible. In such cases the steel dilator may be inserted by the side of the first finger, and very cautiously expanded; or the temporary use of a Barnes bag may be resorted to, either alone or by the side of the finger, until the necessary increase of size has been attained. When the first joints of two fingers are in position the withdrawal of the second finger until only its tip is within the circle will usually permit the immediate introduction of the tip of the third finger by its side, when the process of intermittent dilatation must be repeated with the third, and finally with the fourth, finger. When the os permits the easy introduction of the third joints of four fingers placed side by side, the thumb should also be introduced. The os should then be placed gently upon the stretch by expansion of the hand, which should again be retained immovable until relaxation occurs and permits its gradual passage upward until the os is about the wrist; but at this stage of the operation the precautions against undue haste should be, if possible, redoubled, since the moment at which the projecting knuckles pass the os is that at which laceration of the cervix is most likely to occur, and because if any but the gentlest upward pressure is permitted at this time, the tension upon the vaginal attachments becomes dangerously severe.

Throughout the operation the occurrence of even the least degree of uterine contraction should be a signal for instant quietude of the hand, which, however painful its position, must then be retained immovable until the labor pain has passed away. When the extended hand has been passed within the lower uterine segment it should be gently closed into a clenched fist, in which position it attains its greatest circumference, and should then be gently drawn downward against the os, in imitation of the production of dilatation by the natural progress of the head. When the clenched fist can be passed freely backward and forward through the os, the fullest dilatation which can be reached by artificial means has been attained.[1] If the membranes are unruptured at the commencement of the operation every effort should be used to avoid their accidental rupture and the premature escape of the waters, especially if there is any possibility that version may be necessary.

When dilatation of the os is to be succeeded by the performance of version, the fullest dilatation possible must always be attained; but when it is undertaken as a preliminary to the application of forceps, it is not necessary, and seldom or rarely wise, to attempt to secure full dilatation; on the contrary, when the size of the os is such as to permit the easy passage of the blades, it is usually best to leave its further expansion to be effected by the passage of the head.

INDUCTION OF ABORTION, MISCARRIAGE, AND PREMATURE LABOR.

CONDITIONS WHICH JUSTIFY THE INDUCTION OF ABORTION.—Artificial abortion is indicated in two classes of cases—(1) when delivery of a viable child through the natural passages is impossible, and the induction of abortion offers any advantage to the mother as compared with delivery at full term; (2) when the mother's life is materially endangered by some pathological condition incident to pregnancy, and is likely to be saved by its immediate termination. The consideration of the first class of indications, and the comparison of the relative advantages of the induction of abortion or premature labor with craniotomy and the Cæsarean section, falls more properly under the treatment of contracted pelves, and is fully discussed there. The indications which group themselves under the second class are also described in detail elsewhere, under the heads of the incurable vomiting of pregnancy; incarceration of the pregnant uterus; albuminuria or eclampsia; hæmorrhage during pregnancy; hydramnion; anæmia, chorea, and the other general or systemic diseases; to which must be added the occurrence of actual or incipient insanity during pregnancy; but it is proper to remind the physician here that in all these cases, except insanity, the dangers which threaten the mother are no less serious to the child, whose life is dependent upon hers, and that it must always be the most grave of mistakes to sacrifice both lives by an unduly protracted effort to preserve the less valuable of the two. The occurrence of insanity during pregnancy opens a question of much ethical interest, and one upon which there may be much honest difference of opinion; but it is probable that, in view of the almost inevitable inheritance of the child, the great majority of physicians would admit the right of the mother to sacrifice the fœtus for the sake of the preservation of her own mental balance. The induction of premature labor may occasionally be indicated, in the interest of the child, in cases in which the life of the fœtus has been habitually lost at some period within the last two months of previous pregnancies; but the difficulties which attend the diagnosis of such a condition are so great that but few successful cases have been recorded.

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[1] When the presence of some grave emergency renders a rapid delivery a matter of urgent necessity, and the resistance of the cervix is so great that it becomes evident that the mother's life will be lost before sufficient dilatation can be obtained, it may occasionally be proper to incise the cervix with a blunt-pointed bistoury at three or four points, to a depth of perhaps a quarter of an inch, when further dilatation is usually rapidly possible; but since this procedure exposes the patient to exceptionally grave risks of extensive laceration, it is only justifiable in the face of the most urgent and immediate danger.

PROGNOSIS OF PREMATURE LABOR, MISCARRIAGE, AND ABORTION.—Although the work of the professional abortionist is one of the most prolific causes of the ill-health of women, and is attended by no insignificant mortality, the induction of artificial abortion or miscarriage should, in skilful and aseptic hands, involve no risk to the maternal life, and, in the absence of previous pelvic derangements of inflammatory origin, should seldom or never produce local troubles of importance. The prognosis of induced premature labor should differ but little from the prognosis for labor at term, so far as the mother is concerned. The fœtal mortality is that of premature children in general.

AFTER-TREATMENT.—The care of convalescence after the performance of artificial abortion differs in no way from that already recommended in the description of inevitable abortion.

TECHNIQUE OF THE INDUCTION.—Among the means which have been recommended for the initiation of labor, the use of drugs, such as ergot, quinine, and jaborandi, of prolonged hot-water douches, catheterization or faradization of the uterus, puncture of the membranes, dilatation of the cervix, and mechanical distention of the vagina are the most prominent and deserving of mention. The only drug which can be considered to possess any value in this connection is ergot; but even that can seldom be relied upon to initiate the pains, its chief value being to sustain the action of the other expedients; and even when it is used for this purpose it should be restricted to cases in which the child is dead or not yet viable, on account of the fact that its use produces a state of tonic contraction, which if protracted usually results in the death of the fœtus by embarrassment of the utero-placental circulation. Hot-water douches are somewhat inefficient, and are also useful mainly as adjuvants.

If they are employed at all, the quantity of water should be large, and the temperature should be the highest which the patient can endure. The use of faradic, or even galvanic, electricity, through a vaginal or intra-uterine electrode, has lately been recommended, but has not yet been shown to justify the claims of its advocates. The choice between the other measures must be decided by the period of pregnancy at which the induction of labor is desired, and by a consideration of the physiological processes by which their several effects are produced. For clinical purposes, the process of the induction of labor may be divided into the provocation of pains, and the acceleration of labor after contractions have been aroused—a classification which materially assists in the choice of the methods which should be used at any given moment; but whichever method is adopted, the whole procedure should be conducted under the most rigid antiseptic precautions, including a preliminary flushing of the vagina with a 1:1,000 solution of corrosive sublimate or 1:60 of creolin, which should be repeated at the expiration of twenty-four hours if the delivery has not been sooner accomplished.

Abortion.—During the first three months of pregnancy the element of haste is rarely important, and the chief desideratum is then to choose a plan which will probably result in the expulsion of the intact ovum; and, though many methods are permissible, catheterization of the uterus is perhaps most generally preferred. A small solid bougie, about No. 12 French, and with a very flexible tip, should be carefully introduced into the os, passed well within the uterus in the most gentle manner and if possible without rupture of the membranes, and then retained *in situ* by the insertion into its external end of a catheter stylet which has been bent to an acute angle and is retained in position by the attachment to its other end of a tape tied about the waist of the patient (Fig. 18) and by a T-bandage placed over the vulva. Both bougie and stylet should, of course, be new. The vagina should be thoroughly distended with sterilized cotton pledgets, introduced through a Sims' speculum, and the patient should be given about twenty minims of the fluid extract of ergot every four hours. If at the end of forty-eight hours no descent of the ovum has been produced, it is probable that the decidua are abnormally adherent; that the uterus is extremely unresponsive to stimulus, or that the membranes have been ruptured during the introduction of the bougie, and that the bulk of the ovum has been thereby so much diminished that the uterus is unable to expel it. In either case it is perhaps best to resort to puncture and free separation of the membranes with a uterine sound or other rigid instrument, which should be passed to the fundus of the uterus, and swept about in all directions to insure the rupture of the ovum, or at least a thorough loosening of its attachment to the uterus; after which, under the use of ergot and the tampon, the expulsion of the fœtus may be confidently expected. Another, and perhaps a preferable, method is the mechanical dilatation of the cervix, which at this period is best effected by the use of a branching steel dilator, which should be inserted into the cervix in such a manner that its tips project but little beyond the internal os, in order to avoid laceration of the ovum—an accident which, with care, may usually be escaped. When the dilator is in position the cervix should be gently stretched until the os admits the finger freely, when the vagina should be packed and ergot administered, as before recommended. Should this method fail, a subsequent resort to the bougie or to rupture of the membranes is always possible. If after any of these procedures the expulsion of the ovum is followed by troublesome and persistent bleeding, it is probable that some portion of the decidua is still unexpelled, in which case the interior of the uterus should be thoroughly scraped with a blunt wire curette, and swabbed out with Churchill's tincture of iodine. The cervix is usually at such times sufficiently patulous to permit the passage of a small instrument, but may if necessary be again dilated by the steel dilator, or by the use of Hanks' graduated sounds. The patient should be kept in bed, and the most rigid antiseptic precautions should be observed throughout the employment of these and all other methods for the induction of abortion or labor.

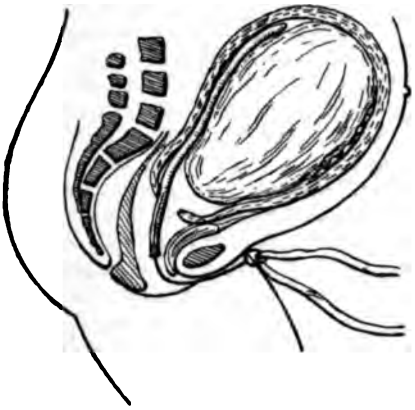

FIG. 18.—METHOD OF FASTENING THE INTRA-UTERINE BOUGIE IN PLACE.

Miscarriage.—If pregnancy has advanced to more than three and less than seven months, the expulsion of the intact ovum is hardly to be hoped for, and it is therefore less necessary to avoid an operative rupture of the membranes during this period. It is usually best to begin by the introduction of a bougie; but if this is not followed by a prompt appearance of regular pains, it is generally best to rupture the membranes with the sound, and then support the action of the decreased intra-uterine pressure by the introduction of a vaginal tampon and the administration of ergot.

Premature Labor.—From the beginning of the seventh month, or perhaps a little earlier, a new element enters into the problem, since the life of the child now assumes importance. It must be remembered that the vitality of premature children is small, and that their resistance to the exhausting effects of the pressure of prolonged labor is very slight; it is therefore important to use every effort to secure as complete dilatation as possible before the rupture of the membranes, in order to avoid, at once, any direct pressure of the uterus upon the child, and the delays of a dry labor; and for the same reason the slower methods of induction are to be avoided. At this period of pregnancy it is usually easy, by the exercise of due care, to introduce a bougie without injury to the membranes; and in some cases this simple procedure is in itself sufficient. If the first bougie fail to excite contractions, the insertion of one or more similar instruments beside it is sometimes followed by the desired result; but, since the cervix is often still rigid and unprepared for parturition, and since many women show great power of resistance to the induction of labor at this time, it is usually best, when catheterization is not promptly efficient, to proceed at once to the procedure *par excellence* for the induction of labor during the last two months, or for the acceleration of labor at term—dilatation of the cervix by manual or other means. When this operation is used for the induction of labor it is usually best to stop the process of artificial dilatation when the os has been raised to the size of a silver dollar, and trust the remainder of the labor to the efforts of nature, which then seldom fail; but, since it is by no means an unknown occurrence to find the os recontract and the contractions disappear, the physician should remain by the bedside, or should at least visit the patient frequently, from this time on, and, if labor fails, should again dilate the os, and this time to a degree sufficient to permit the passage of the head. The membranes should then be ruptured, the head made to engage by pressure from above, and held in position by external pressure until some progress is perceived, when the further course of the case is closely similar to labor at term; but, since it is a fact that premature children resist the pressure of carefully conducted operative delivery much better than that of prolonged labor, the attendant should be somewhat more ready to interfere than in ordinary cases.

Delivery by version may be effected with ease in most cases, but the use of forceps is usually to be preferred, since these feeble infants are greatly exhausted by the necessarily rough manipulations of version.

CHAPTER XI.

FORCEPS.

Choice of Forceps.—Before entering upon the technique of forceps operations it is necessary to say something about the choice of instruments. So many varieties have been described by various obstetricians that it is impossible even to mention any but the most important, and those which are most typical of a class. The instruments in common use may be divided into three classes—short forceps, long forceps, and those furnished with axis-traction attachments.

Short Forceps.—Short forceps are intended for use when the head is at the pelvic outlet, and have a cephalic but no pelvic curve. Their only advantages are the small space which they occupy in the obstetrical bag, and a slightly greater ease of adaptation; but since a pair of short forceps alone is never a sufficient equipment, they are practically an extra luxury, and are now but little used. The preferable form of short forceps is that known as Sawyer's (Fig. 19).

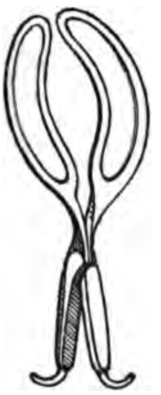

Fig. 19.—Sawyer's Forceps.

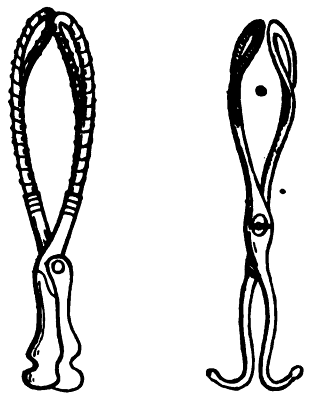

Fig. 20.—*a*, Smellie's Forceps; *b*, Levret's Forceps.

Long Forceps.—Long forceps are intended for use in any portion of the obstetric canal, and possess both pelvic and cephalic curves. Among the instruments most commonly used we may still trace the influence of the two original types, the Levret and Smellie models (Fig. 20). Smellie, aware of the necessity of high-forceps operations, but strongly impressed with their dangers, sought to lessen the risks by shortening the handles and so reducing the compressive power. Levret, on the other hand, preferred to equip himself with a powerful instrument and trust to his own discretion for caution in its use; and instruments but

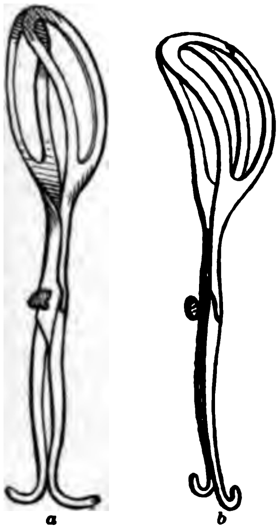

FIG. 21.—FORCEPS OF HODGE, *a*, AND WALLACE, *b*.

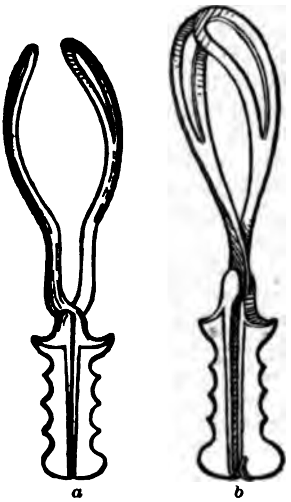

FIG. 22.—*a*, SIMPSON'S FORCEPS; *b*, ELLIOTT'S FORCEPS.

slightly modified from the original model of Levret are still used in France, but are now seldom seen in this country. Among the forceps which stand high in the esteem of the profession in America, the Hodge and Wallace instruments follow the type of Levret (Fig. 21), while Simpson's, Elliott's, and the Vienna forceps (Fig. 22) tend rather to that of Smellie.

Hodge's forceps is shorter, lighter, and more graceful than the original French model, and the fenestræ are wider; but it retains the long metallic handles and the French, or pivot, lock. Wallace modified Hodge's instrument by adapting to it the peculiar blades devised by Davis, of London. Both are excellent models and have many admirers. Simpson's forceps, the most widely known of all of those which follow the Smellie type, has longer shanks and a sharper cephalic curve than the Hodge or Wallace instruments. It is fitted with an English, or mortise, lock, the handles are shorter, are made of wood, are furnished with transverse shoulders for the upper or traction hand, and with indentations to fit the fingers of the hand which grasps them. This model, though excellently well qualified for seizing the head in any position, and for use as a tractor, is not capable of very forcible compression, a condition which is perhaps a great advantage for the majority of operators. Braun's modification of Simpson's, the so-called Vienna forceps, differs from it only in the material of the handle, which is made of hard-rubber moulded around the shank, and in some slight alterations in the weight and proportions of the instrument. The well-known Elliott forceps are a long, highly curved, and somewhat heavy modification of Simpson. Their distinguishing feature is the existence of a thumb screw by which the separation of the handles can be regulated; a device which, though sometimes a convenience, is distinctly unnecessary, and extremely difficult to keep clean. A few operators, who believe that non-festrated blades are less likely to injure the soft tissues of the pelvis and head, have constructed instruments upon this plan; those of Winckel and McLean being the best known; but the advantage claimed for these models is probably counterbalanced by their encroachment upon the already scanty pelvic space.

The choice between these various types of instruments is regulated largely by fashion, and by local prejudice; and it is undoubtedly true that it is far more important that the individual instrument should be well made, than that it should follow one or the other plan. The points which should be most carefully sought for in any forceps are well rounded, blunt edges; firm, well-tempered blades; strong shanks with but little spring; and close but not too tight adjustment of the locks; and, other things being equal, the English lock is decidedly preferable to the French.

Until recently it could be truly said that the possession of a single pair of good long forceps was amply sufficient for all the needs of ordinary practice; but to this it is now necessary to add that the operator who intends to do high forceps, and wishes to give his patients all the advantages of modern resources, must possess, in addition, some form of axis-traction instrument; and can only be possessed of a complete equipment within the compass of a single forceps, by adopting one of those models which are furnished with accessory axis-traction appliances; and which are so little modified that the blades when divested of their axis-traction rods, are still suitable for low operations.

AXIS-TRACTION FORCEPS.—It has long been known that when the forceps is applied to the head at the superior strait, and traction is made upon the handles, the line of effort is such that, under the most favorable circumstances, a large portion of the force expended is wasted in compression of the head against the tissues of the anterior pelvic wall (Fig. 23). From an early date many efforts have been made to alter the line of traction, either by bending the handles backward, or by attaching rigid traction arms of similar effect; but the exact line in which traction should be applied varies so much with the varying presentations and positions of the head, and with the variations in the form of individual pelves, that the line of traction furnished by any rigid instrument is likely to be little less erroneous in a given case than is that of the simple instrument; and the advantages of these forceps proved to be so slight that none of them ever attained any wide popularity. It remained for Tarnier to invent the first really useful axis-traction instrument (Fig. 24), by adapting to

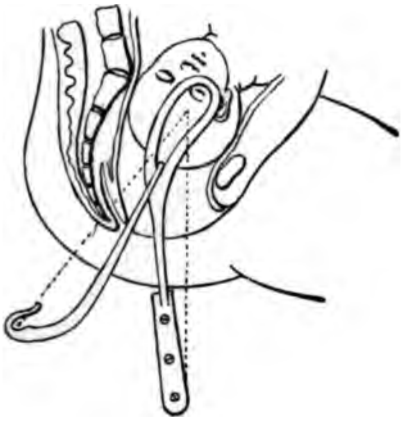

FIG. 23.—AXIS TRACTION.

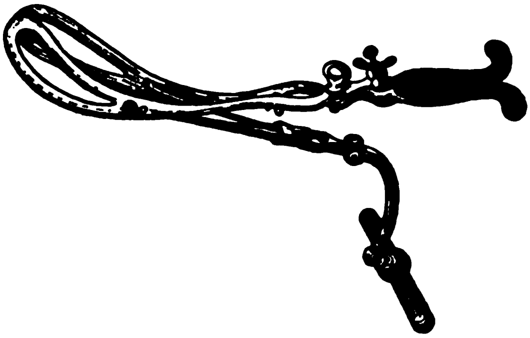

FIG. 24.—TARNIER'S AXIS-TRACTION FORCEPS.

the ordinary forceps a pair of curved rods, attached to the blades at a point close to their grasp upon the head, by a freely movable joint. With this appliance, if traction is made in an even approximately correct direction, the head moves automatically in the direction of least resistance under the influence of the mechanical forces involved; and the delivery is consequently effected by the expenditure of the least possible degree of force,[1] and it is a noteworthy fact that all the successful instruments which have followed his first model, including the many modifications which he has himself produced, have been mere attempts at simplification of his device, without any essential alteration of its plan; with the single exception that the forceps of Breus (Fig. 25), which is now so widely used in Germany, varies from that of Tarnier in having dropped axis-traction as such; and retains as its sole essential feature, only the movable joint between the head and traction handles; which Breus considers the only valuable element in these instruments.

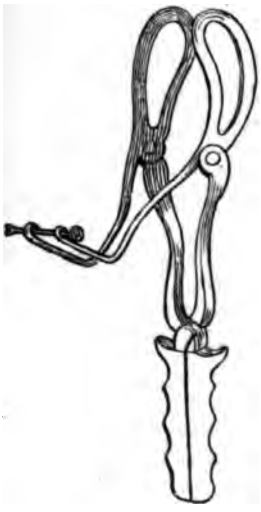

FIG. 25.—BREUS' FORCEPS.

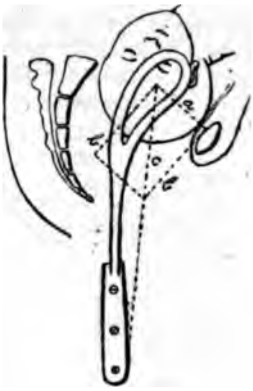

FIG. 26.—DIAGRAM OF FORCES ILLUSTRATING AXIS-TRACTION. If the line *c* represents the amount and direction of the traction force which is applied to the handles of the forceps, the line *b* represents the amount of force which is utilized in extracting the head, and the line *a* that which is wasted in compressing it against the pubes.

Tarnier's original model possessed two antero-posterior curves, was unnecessarily complicated, and was soon modified by its author, whose latest model (Fig. 24) is one of the most graceful and convenient yet devised. One of the best known of American instruments, Lusk's modification of Tarnier, on the contrary retains the extra curve; but though this instrument is undoubtedly convenient for use in some difficult high cases, its greater difficulty of application makes it less valuable for general use. Simpson's axis-traction forceps is merely a somewhat long and heavy Simpson forceps, to which axis-traction rods have been attached by a screw and nut. Its sole objection is that it is difficult to clean. Felsenreich has improved upon this instrument by attaching the rods to the blades by the joint commonly used in surgical scissors, and by supplying a detached compression screw which fits into a slot upon the handles; the forceps itself being practically unmodified, and perfectly fit for common use. The author has used for some years with much satisfaction an appliance (Fig. 27) which was devised in accordance with the belief that it is a decided advantage to the general practitioner to use one pair of forceps, with the curves of which he is thoroughly familiar, for all emergencies; and that it is a practical advance to supply an axis-traction attachment, that can be applied to any pair of forceps of which the practitioner is already possessed, without the necessity of making any alteration in them. This contrivance consists of a pair of steel rods, which terminate at their upper ends in flat buttons intended to engage in the lower extremity of the fenestra; and at their lower ends in hooks, which are received by rings connected with a transverse traction-handle. A separate compression screw for fixation of the handles, is a convenient but not an absolutely necessary accessory. The instrument is simple, and easily cleaned; and, when the rods are attached to the forceps, is similar in all respects to the Simpson model. The rods may be hooked into the blades after the latter have been adjusted to the head, but most operators prefer to place them in position before making the application.

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[1] It is to be noted that the force actually expended in effecting delivery is the same with either instrument; because the excess of power required by the simple forceps, over that which is necessary with an axis-traction instrument, is all expended in grinding the head against the maternal tissues, and in directly obstructing progress (Fig. 26).

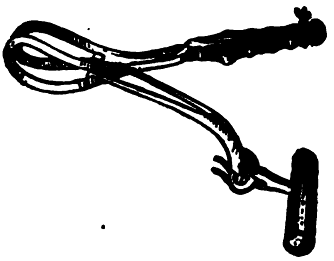

FIG. 27.—REYNOLDS' AXIS-TRACTION RODS ATTACHED TO THE VIENNA FORCEPS.

Axis-traction is of value only while the head is still above the inferior strait, and is consequently applied only to long forceps.

FORCES OF THE FORCEPS.—The forceps is an instrument capable of exerting three different forces; those of traction, compression, and leverage. Traction is the essential power of the forceps.

It is for the application of this force that the instrument was devised; and operators of limited experience will act most wisely by limiting their use of the forceps to this force alone.

Compression of the head by forced approximation of the blades is a force which is never entirely absent; since a certain amount of it is essential to a proper grasp of the presenting part, but the amount of compression which is thus incident to the use of the instrument is fortunately never injurious. The injudicious use of an improper amount of compression is of course harmless to the mother, but exposes the child to the most serious risks of fatal injury; and is indeed the only element in the use of forceps which can be injurious to the child.

The amount of compression which the fœtal head can sustain without injury is largely dependent upon the diameter to which that force is applied; and it may be laid down as a rule that compression of the bi-parietal diameter to the extent of any more than half an inch is seldom harmful, if not continued without interruption for more than two minutes. Compression in the occipito-frontal diameter is almost equally well borne, and to about the same degree; but diminution of the oblique diameters of the head, *i.e.*, those drawn from either side of the brow to the opposite side of the occipit, is far more likely to be productive of intra-cranial injury; though, even in this situation an intermittent compression of no more than half an inch, is comparatively safe in the majority of cases. Uninterrupted compression or an intermittent approximation of the blades, beyond the above amount, is, however, so highly dangerous that the greatest care must always be taken to avoid its unintentional use; while in the rare cases in which the operator finds himself obliged to resort to a more extreme degree of compression, he should always feel that he is subjecting the child to a desperate chance for its life.

The cephalic curve of all good forceps is so blunt, that when the blades are applied to the sides of any ordinary head, the handles are so nearly in contact that a dangerous amount of compression is impossible; but if for any reason it is impossible to secure such an application, and the handles of the forceps are found to be widely separated, when the instrument is in place, the force of traction must necessarily expose the child to grave danger of undue compression, unless special precautions are taken. With the Elliot forceps this danger may be avoided by so setting the thumb screw, which is their special feature, that it is impossible to exercise a greater degree of compression than is considered safe. The same object may be equally well attained with other models, by the insertion of a folded towel between the handles.

Leverage is a force obtained by lateral or antero-posterior pendulum movements of the handles. By the use of leverage, it is sometimes possible to overcome an arrest which has resisted simple traction; but it is so difficult for the operator to estimate the amount of force which he is employing, and the danger to the tissues of the mother is so extremely great, that the use of this method is distinctly inadvisable to any but the most expert operators; and the beginner may feel sure that by the time his experience justifies him in attempting the use of leverage, he will find himself so fully impressed with its dangers that he will reserve it for a last resource.

Rotation of the head by the forceps is closely analogous to the employment of the pendulum movement; and is indeed in effect a species of leverage. Forced instrumental rotation is so extremely likely to be followed by extensive laceration, and its safe performance implies so accurate an adjustment of the blades and so instinctive a knowledge of the position of their tips, that its use should be restricted to experienced operators; but even the beginner must be careful to avoid disturbing the mechanism of delivery by the prevention of rotation; that is, whenever forceps are applied before rotation is completed, the operator should bear carefully in mind the direction toward which the head will naturally turn, and should be ready to permit, or indeed favor, its occurrence.

ANÆSTHESIA IN FORCEPS OPERATIONS.—It is probable that the skilful use of forceps is but very slightly more painful than normal delivery; and the presence of the pains in an unetherized patient may greatly facilitate the extraction of the child; but most patients feel so much dread of any operative interference, that its performance without ether is likely to be attended by a very undesirable amount of nervous exhaustion. All women are, moreover, prone to attribute any pain which they may feel during the performance of an operation to the efforts of the physician; and to resent its infliction by unguarded movements, which may often result in unnecessary laceration. It is therefore customary, in all but the crudest practice, to administer an anæsthetic before making even a low application of the forceps, unless some special contra-indication exists; and it is rarely wise to attempt even the simplest of high operations without the use of ether or chloroform. If anæsthesia is not employed, the forceps should be warmed before being introduced; and in any case, the external surface of the blades should be thoroughly anointed with an aseptic lubricant.

CONDITIONS WHICH JUSTIFY THE APPLICATION OF FORCEPS.—These are: a presentation of the cephalic extremity of the fœtus, or of the full breech; ruptured and retracted membranes; an os so far dilated as to permit the easy introduction of the blades, and the existence of a possibility of delivering a living child.

CONTRA-INDICATIONS.—Forceps should never be applied to the hydrocephalic head; nor to the head of a dead child, unless the operation promises to be easy. They should never be used on a putrid fœtus, nor upon a perforated head. The diminished size of the perforated head makes the forceps extremely liable to slip from its surface; an accident which is almost certain to result in the production of extensive laceration. The use of the forceps upon hydrocephalic or putrid heads is rendered dangerous by the uncertainty of its grasp, and should be avoided, not only for this reason, but on account of the absence of any objection to the performance of craniotomy.

CLASSIFICATION OF FORCEPS OPERATIONS.—The forceps may be applied to either extremity of the fœtus when engaged in any portion of the pelvic canal; but the severity and the technique of the operation vary so greatly with the amount of progress already effected, that it is necessary to consider the application of forceps to high and low heads under separate headings. The methods of application should, moreover, be so radically altered in accordance with the varying presentations and positions of either presenting part, that it seems most conducive to clearness to describe the general principles which should be followed in all forceps operation under the head of the anterior positions of vertex presentations, high and low, to which the remainder of this chapter will accordingly be devoted; while the application of forceps to other presentations, and to posterior positions of the occiput, will be considered in the chapters devoted to the general management of those cases.

Skill in the use of forceps, that is, the instrumental extraction of the child with a minimum degree of force and a minimum amount of danger to both patients, is almost wholly dependent upon a careful imitation, throughout the operation, of the mechanism of natural labor in the given presentation and position; since with ordinary adaptation it is impossible for the head to pass the pelvis by any other method, unless under the influence of an extreme and unnecessary degree of force. The quality of an operator's work will, therefore, depend essentially upon the correctness of his diagnosis of position; and it should be an invariable rule, that his last act before applying forceps should be an effort to obtain an accurate perception, not only of the quarter of the pelvis in which the occiput lies, but of the exact direction of the sagittal suture, and of the situation of the parietal bosses. The importance of avoiding any mistake in this matter is so great that it is a safe rule that forceps should never be applied unless both fontanelles, or one fontanelle and an ear, have been surely recognized; and, as a last step before operating, the catheter should be passed; and the operator should himself listen to the fœtal heart, in order to form an estimate of the condition of the child, and of the amount of delay which he may permit himself in the effort to conserve the perinæum.

LOW FORCEPS IN ANTERIOR POSITIONS.—*Prognosis.*—The application of forceps, when the head is within the excavation and the occiput is anterior, is distinctly a minor operation; and should not increase the gravity of the outlook for either mother or child, except as concerns a slightly increased risk of laceration of the perinæum, and such slight risks as may appertain to anæsthesia.

Indications for Low Forceps in Anterior Position.—The risks being so slight, it follows that the application may be made for comparatively slight indications. The practice of different accoucheurs varies widely, but it is probably safe to say that when the second stage of labor has existed for two hours, and the rate of progress is such that there seems to be no probability that spontaneous delivery will occur within the next hour, the fœtal death rate is on the whole smaller if immediate delivery be resorted to than if such cases are left to nature.

Technique.—The forceps may be applied in two ways: the blades may be so introduced as to be adjusted exactly to the sides of the head, or they may be so placed as to lie against the sides of the pelvis, without regard to the position of the head. Either of these applications may be made by two methods; the forceps may be passed directly into the position which they are expected to occupy, or each blade may be introduced opposite to a sacro-iliac synchrondrosis, and then swept around the sides of the head into position.

The application to the sides of the head is perhaps the more difficult, but possesses two great advantages. When the instrument is so placed it has much less tendency to disturb the normal mechanism of labor, and it moreover exposes the child to a greatly decreased risk of injury from compression. It may occasionally happen in difficult operations that an inexperienced operator will find it difficult to place the forceps accurately over the parietal bosses, but such cases must be rare in low applications to the anterior occiput; and in low arrest the accoucheur should never feel satisfied with any other application.

In anterior positions the direct method of application is usually easy, and should generally be preferred; since it exposes the tissues to a minimum amount of friction against the instrument, and to a minimum risk of laceration.

The patient being in position, and all preparations being made, the operator should lock the forceps outside the vulva in order to avoid a mistake in the choice of blades, and should place them outside the vulva, in the position in which they will lie when applied to the head; *i.e.*, with their transverse axis at right angles to the line of the sagittal suture; he should then select the left blade, that is, the blade which passes to the left side of the mother's pelvis, and whose handle is grasped by the left hand of the operator. The handle of the forceps should then be lightly seized by the thumb and two fingers of the left hand, in the manner in which one holds a pen; two or more fingers of the right hand should be passed as high as is possible without undue force between the head and pelvic walls opposite to the parietal boss over which the blade is to pass, and if any portion of the cervix be still recognizable, should be inserted within the os. The forceps blade should hang loosely from the fingers by its own weight; should be passed through the vulva along the palmar surface of the vaginal hand, and should be urged onward by pressure with the right thumb against its heel. The edge of the blade should rest in the groove between the fingers, so that, as the tip advances they are able to receive an accurate perception of its double curves, and to estimate the probable position of the tip during the entire process of introduction (Fig. 28).

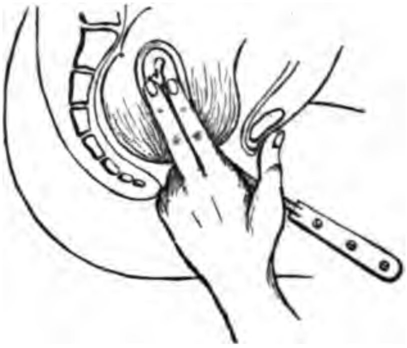

FIG. 28.—INTRODUCTION OF THE FORCEPS.

The common mistake of young operators is to attempt to push the blade onward in the straight line of its handle; the beginner should therefore endeavor to bear in mind the fact that its proper introduction requires a constant remembrance of its compound curve; and that the handle must not only be gradually and smoothly depressed in obedience to the pelvic curve of the instrument, but must be simultaneously rotated upon its own axis in order to insure a constant and close application of its cephalic curve to the tissues of the scalp.[1]

During the whole process of introduction the tip should be in close contact with the fœtal head, the forceps should be allowed to guide itself, and no force should be used. If the blade is arrested it may be taken for granted that its failure to advance is due to the fact that the tip has been given an improper direction and is pressing too hard against the maternal soft parts or the fœtal scalp. In such an event the use of force can only result in injury to one or the other; but progress will at once be made, without increased pressure upon the handle, so soon as gentle movements of adjustment have guided the tip into the proper situation. When the first blade is in position its handle should be given to an assistant, who must hold it with the palmar surface of his hand uppermost, in order to keep his wrist out of the way of the operator, and must be careful to maintain it in exactly the position in which it was given to him. The second blade is then introduced in the same manner on the opposite side of the head, and during its passage into position its movements should be so guided that when it reaches its final resting place its handle is directly opposite to that which is already in place: the position of the first handle being the guide for the introduction of the second. If the blades are exactly opposite each other, the forceps will lock without force; but if this does not occur, it is better to remove the second blade and re-apply it than to use any but the most minute movements of adjustment, any eversion of the forceps tips by rotation of either blade on its long axis being an experiment which is especially dangerous and to be avoided. During the locking of the forceps the operator should be careful that no portion of the vulva, or vulvar hair, is pinched within the lock of the instrument, this being an accident which is productive of the utmost pain to the patient if unetherized, and which may moreover result in the production of serious contusions.

At the conclusion of the application, if the blades lie in the proper position, with each parietal boss and its corresponding ear included within a fenestrum, the handles should meet each other without force; but if they remain slightly separated, it is probable that the head has been clasped, not by the biparietal, but by one of the long oblique diameters; and should this be the case it is usually better to remove and readjust the instrument, than to subject the child to the increased risk of compression which this application involves.

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[1] The peculiar spiral movement of the instrument can best be appreciated by placing the edge of one blade in the groove between the first and second fingers, pushing it gently onward without any attempt to guide its movements by means of the fingers which control the handle, and then watching the course of its tip.

If the indirect method of application is chosen, each blade should be introduced, and passed to the full height necessary, in the space opposite the sacro-iliac articulation, or at any other point in the pelvis which seems to afford abundant room; and should then be swept into position on the sides of the head, by pressure with the internal fingers on the edge of the blade; care being taken that the whole surface of its cephalic curve remains closely applied to the head throughout the whole manœuvre.

When the instrument has been satisfactorily adjusted to the head, the left hand of the operator should grasp the handle with its palmar surface uppermost; and the right hand should be placed over the head with its palmar surface downward, and with the shanks of the forceps lying between its second and third fingers (Fig. 29). The first tractions should be gentle, and gradually applied in order to test the security of the grasp which the forceps have taken upon the head, and thus guard against the possibility of its slipping in case an error in diagnosis has been made. When the operator is fully satisfied that the instrument is unlikely to slip, he should increase his efforts until the maximum force which he thinks advisable has been attained; should maintain them at that height for a space of from one to two minutes, and then gradually allow them to decrease, in imitation of the natural pains.

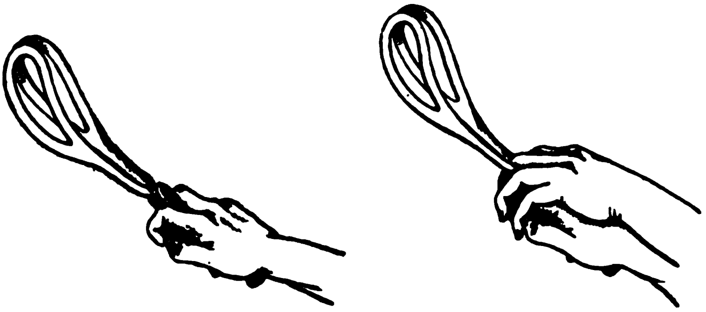

FIG. 29.—METHOD OF GRASPING THE FORCEPS.

When the forceps have been applied through the partly dilated cervix, the amount of tractile force which is applied should be estimated by ocular or digital observation of the degree of tension to which the edge of the os is subjected, precisely as is done in the preservation of the perinæum; and in case the cervix should be found to be so rigid as to obstinately resist dilatation, or if the usual bilateral laceration is seen to begin, antero-posterior divisions of the edge of the os to a depth of from one-fourth to one-half of an inch usually determine the advent of laceration in that situation; and are expedient, because antero-posterior lacerations usually heal spontaneously during the puerperium. If the forceps lie in an oblique diameter, the operator should be especially careful that his grasp upon the handles opposes no obstacle to that rotation of the forceps with the head which is sure to take place as soon as the resistance of the pelvic floor is met. If the blades have not been adjusted to the sides of the head, the handles should be gently separated during the intervals, in order to intermit all compression, and thus permit the head to rotate between the blades. The first tractions should be directed as far backward as the perinæum permits; but as this is put upon the stretch by the advance of the head, the handles should move gradually upward, their axes being directed a little higher after each successive traction. The proper direction for each traction is determined by the extent to which it distends the perinæum, and by the amount of pressure which exists between the occiput and pubes; and may be learned with accuracy by the occasional passage of one finger between the head and pubes during traction. The ideal line of force is always that which holds the head in contact with the anterior pelvic wall, and but lightly applied to it.

When the occipital protuberance appears under the symphysis, the shanks of the instrument should be steadied by the right hand, while the left changes its grasp, and seizes the handle with its dorsal surface upwards. The operator should then stand opposite the patient's left buttock (Fig. 30); and while still continuing gentle traction directly upwards, should sweep the handles forward toward the mother's abdomen, in the curve of Carus; thereby extracting the head by a mixed movement of descent and extension, during which the sub-occipito-bregmatic diameter describes an arc of a circle around the lower edge of the pubic arch as a centre, the right hand observing and controlling the movement by pressure upon the forehead through the tissues in front of the anus, in the manner described under normal labor.

When the edge of the fontanelle is at the fourchette the plans adopted by different operators vary. Some prefer to control the head by retaining the forceps in position, believing that the effort to remove them before delivery is completed is likely to be itself productive of laceration, while others think that this danger is more than counterbalanced by the relaxation of the tissues which results from the extra space gained by the removal of the instruments.

If this latter method is chosen, two fingers of the right hand should be inserted into the rectum and should have reached the chin before the blades are taken off; and during their removal the advance of the head must be controlled by pressure with the right thumb against the occiput, if this be possible, or by the hand of an assistant. The forceps should then be unlocked, and the left hand should withdraw whichever blade seems the less firmly fixed; the motion of withdrawal being the reverse of the spiral curve which was followed in the introduction. Should the blade first selected be arrested when partly withdrawn, it should be steadied by an assistant until the removal of its fellow, when it will probably be released by the additional space gained; if, however, one or both blades are firmly held, it is better to relinquish the attempt to withdraw them, rather than to use any force, since either of them might be looped about an ear, and any force might result in its laceration.

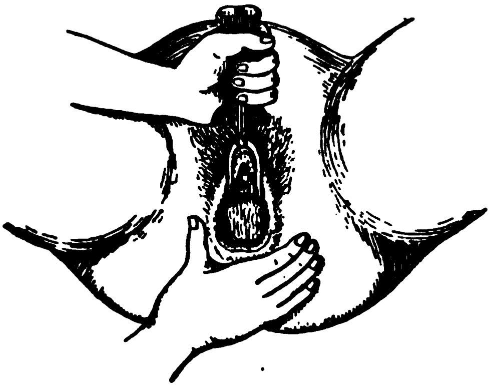

FIG. 30.—PERINEAL STAGE OF FORCEPS OPERATIONS.

If the operator prefers to conclude the extraction by means of the forceps he should continue his tractions with them, in the curve of Carus, watching the perineum closely, preserving flexion both by means of the forceps and by pressure on the forehead over the tissues about the anus, forcing the head to hug the symphysis as closely as possible, and constantly holding himself in readiness to check any unduly rapid advance, by backward pressure with the instrument, or by applying the fingers of the right hand to the occiput.

HIGH FORCEPS.—*Prognosis.*—The application of high forceps in anterior positions differs from the low operation in that, so far from being a trivial matter, it is in every sense a major operation, which exposes the mother to grave risks of serious laceration and involves necessarily a chance of serious compression to the fœtal head, which results, in the hands of the best operators, in a by no means inconsiderable fœtal mortality.

Indications.—The operation should never be undertaken unless some pathological condition renders the dangers of delay to mother or child distinctly greater than the risks of operative interference, or unless the arrest of progress is so complete that there seems to be no prospect that the head will pass the superior strait under the force of nature, and the exhaustion of one or the other patient is already imminent.

The discussion of the various pathological conditions which may justify immediate delivery must be relegated to the chapters devoted to those complications.

The best rule for the application of high forceps for the treatment of simple delay is that, when the caput is large and increasing, when the fœtal heart or maternal pulse is steadily and perceptibly rising, and no progress has been made for at least an hour, the forceps should be applied; but, in view of the greatly increased fœtal death rate when the operation has been delayed until exhaustion is already present, it should be an invariable rule that the physician should maintain a most careful watch over the condition of the fœtal heart whenever the progress of the head through the superior strait is anything but satisfactory.

The difficulties of the high applications are often so great that, unless in exceptional circumstances, it is distinctly unwise to attempt any high operation without the use of surgical anæsthesia; and the question of the choice between forceps and version in the treatment of high arrest is frequently so intricate a problem that it is usually wise for an accoucheur of small experience to summon a consultant before interfering in such a case.

Technique of High Applications.—In high, as in low, operations the application of the blades to the points of election at the sides of the head is distinctly an advantage to the child as well as to the mother; and with proper care a persistent and skilful operator will rarely or never fail in making such an application in normal pelves. The difficulties are, however,[1] sufficiently great to deter many excellent authorities from recommending the attempt to the inexperienced; but the diminished percentage of lacerations and the decrease of fœtal mortality, due to such exactitude, is also so great that the author believes that every obstetrician should teach himself to apply the forceps in this way in all cases; an art which can only be learned by making persistent efforts to attain it in every case which comes under observation. This course is, moreover, rendered justifiable by the fact that the danger of injuring the mother's tissues by moderately prolonged efforts to secure an accurate adjustment is extremely slight so long as the operator is able to restrain himself from the temptation of attempting to overcome obstacles by force; that is, so long as he remembers that the only possible obstruction to the advance of the blade is that its tip is so placed that it is in unduly firm contact with either the maternal or fœtal tissues, and that if the tip is properly directed between the two there is nothing to oppose its onward movement.

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[1] The importance of an exact application to a high head, and the extent to which the tips may encroach upon the maternal tissues in oblique applications, with one of the accidental disadvantages of such inaccuracies, is well exemplified by a case in which the author had occasion to perform a high forceps operation without ether, and failing to apply the forceps accurately to the sides of the head at the first attempt, made traction with the blades in correspondence to the sides of the pelvis.

If several such efforts to attain an accurate adjustment to the sides of the head have merely resulted in securing an oblique position of the instrument, it is allowable, in high arrest, to proceed with the extraction with the instrument in that position. The forceps will then be so applied that the anterior blade is in contact with the temporal region, while the lambdoidal suture of the other side is opposed to the fenestra of the posterior blade (Fig. 31); in which position the compressive force of the forceps tends in itself to produce rotation.

The application of the forceps to the head at the superior strait by the direct method is rarely possible, and the indirect must generally be adopted. The anterior blade is so much the more difficult of application that it is customary to introduce this first in all cases. Its adjustment is then more easy than if it were complicated by the presence in the vagina of the shank of the posterior blade.

The patient being in position and everything in readiness for the operation, the physician should lock the forceps and turn them into the diameter which they are expected to occupy, out-

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Having assured the patient that the operation would not be attended with excessive pain, he was much chagrined to hear her scream with agony during each traction, complaining that she was tortured with excruciating pains which extended from one hip to the corresponding knee. In the belief that some projecting part of the blades must be exerting pressure upon the intra-pelvic portion of the sciatic nerve upon that side, the blades were removed and reapplied to the sides of the head, when a somewhat forcible extraction was performed without any recurrence of unbearable pain. The case also suggests the possibility that a clumsy operation may occasionally be the starting-point of the intractable sciaticas which not infrequently make their appearance shortly after labor, and which may then continue for many years.

side the vulva, and should then select the blade which is to be anterior. Two fingers of the hand which has the same name as the position should be passed within the cervix, and should find the spot at which there is the greatest space between the head and the posterior surface of the symphysis. The fingers having been passed as high as possible into this space, the anterior blade should be introduced between their palmar surface and the head, should be passed into position under the guidance of their sense of touch, and should then be urged forward to a situation over the parietal boss by pressure with the internal fingers upon the convex edge of the fenestrated portion. The fingers of the other hand should then be passed within the cervix and urged high as is possible, without the use of force, into the space between the head and the sacro-iliac notch, on the other side. The posterior blade should then be passed into position under their guidance, and adjusted to a position opposite to its fellow.

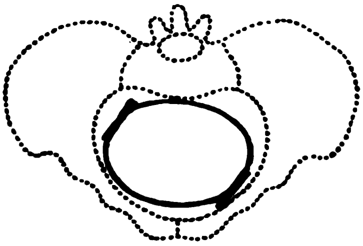

FIG. 31.—ACTION OF THE COMPRESSIVE FORCE OF THE FORCEPS IN PROMOTING ROTATION.

It must be noticed that in O. L. A. positions this rule leads to the introduction of the right blade first, and that, owing to the construction of the lock of most forceps, it is necessary to introduce the second or left blade behind the shank of its fellow, a proceeding which is much facilitated by temporarily drawing the first handle toward the left thigh of the mother; in O. D. A. positions no such special precaution is, however, necessary.

If the head is already engaged in the superior strait, it is only necessary to avoid the use of any force, which might alter its position; but if, at the time when the instruments are applied, the head is still free above the brim, it is usually important that it should be held in position by external pressure from the hands of an assistant, in order to prevent the occurrence of partial rotation during the application of the forceps.

Should the forceps, after the application of both blades, fail to lock, that blade which seems to be in fault should be partly withdrawn, and gently moved, during its reintroduction, into a position which corresponds with that of its fellow; but, in high forceps especially, all attempts at forcible apposition of the blades, when in position upon the head, must be unhesitatingly condemned. If the instrument has been successfully applied to the sides of the head, the handles will be found in close approximation; but if the application is oblique they will be separated by a greater or less interval, in which case the head is always exposed to serious risks of undue compression; and if the grasp is such that the handles are separated by more than the amount which will allow a half-inch of approximation to the blades, it is always best to adjust a folded towel between the handles, in such a way that a greater compression than this is impossible, before any traction is made. If the application was oblique the forceps should be removed and readjusted to the sides of the head as soon as it has entered the excavation.

As in low operations, the first traction should be gentle, gradual, and tentative, and intended more to test the grasp of the instrument and the possibility of its slipping than to advance the head. When the security of the blade has been ascertained and serious tractions are begun, they should be directed as far backward as the perineum will allow; but, as will be seen by a glance at figure 23, traction in the axis of the superior strait can never be attained by simple pulling upon the handles of the ordinary instrument; and if axis traction be not employed, it is always best that one hand should be placed upon the shanks of the instrument near the vulva, and should be used to make downward pressure, while the other grasps the handles near their extremity, and exerts traction at an angle of about 45° to the horizon, thereby combining an outward pull with a backward leverage between the hands, in such a manner that the resultant of the force employed is as nearly as possible in the desired direction. This effort should be continued until the passage of the head through the superior strait makes the remainder of the extraction a low operation. A successful application of this method of traction requires, however, not only a high degree of operative skill, but considerable muscular strength; and the author believes that the obstetrician who performs a high-forceps operation without axis-traction forceps when such an instrument is at hand distinctly fails to offer his patient one of the most important advantages of modern obstetrics; and this the more certainly from the fact that the recent simplifications in axis-traction models render them easily amenable to the use of any physician who is qualified to perform any serious obstetrical operation.

Application of Axis-Traction Forceps.—The application of the modern forms of axis-traction instruments requires little additional description. In Tarnier's latest model and in Lusk's modification of Tarnier the traction rods are so shortened as to lie flat against the blades until the application has been concluded; but with most other forms it is necessary to lift the rod which is attached to the female blade over the other handle before locking the instrument. If the author's rods are employed in connection with the ordinary forceps they may be attached to the fenestra with the forceps already in position, in all but extremely high applications—and even in these the attachment is usually easy if made before the forceps are locked—but most operators prefer to place them in position before the blades are introduced, when the application is exactly similar to that of Simpson's instrument.

When the instrument is in position the transverse bar is attached to the rods, and the handles are grasped and compressed by the hand to the desired degree. The compression screw is then tightened to that position, but no further, any approximation of the handles by the use of the screw being always highly dangerous on account of the impossibility of estimating properly the amount of force so obtained, and the ease with which a fatal degree of compression could be applied.[1]

The traction bar is swept backward so far as the perineum will allow, and traction applied to it alone. As the head advances the handles are seen to rise slowly in the curve of Carus, and their upward movement should be followed by a similar alteration of the line of traction.

In operating with the unmodified instrument, the French school of obstetricians consider artificial rotation by the forceps at the brim as sometimes justifiable; but most American and German operators think that even the most expert are unwise in permitting themselves to use any force but that of simple traction while the head is still high; and nothing should tempt the inexperienced accoucheur to permit himself the use of any pendulum movements or to make any attempt at rotation by the forceps while any part of the head is still within the uterine cavity. If axis-traction rods are used, flexion and rotation of the head take place automatically under the guidance of the mechanical forces of the obstetrical canal, and require no special care upon the part of the operator; the only precaution necessary being that the tractions should be intermittent, and that the compression screw should be released during the intervals.

Some operators prefer to complete the extraction with an axis-traction instrument, but the expediency of this course of action is very doubtful. Not only does the special value of such instruments decrease with the advance of the head and become least at the inferior strait, but the presence of the rods and the greater bulk of most axis-traction models necessarily expose the tissues of the pelvic wall to increased danger of laceration; so that it is usually better to remove the axis-traction instrument when the head reaches the inferior strait, and complete the delivery with the simple forceps.

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[1] If traction is made upon the rods at a time when the handles of the instrument are not held in position either by the screw or by the hand of the operator, the only result is the immediate removal of the forceps, unless the lock is of the French form.

CHAPTER XII.

VERSION.

THE term version is applied to all operations by which the long axis of the child is changed in its relation to the long axis of the uterus. The operation is divided into three varieties—pelvic, cephalic, and podalic version—each named after the part which is to be brought to the inlet; and is performed by three methods, the external, the internal, and the combined or bipolar.

PELVIC VERSION is rarely performed, and then only by the external method. It is indicated in cases in which it is known at the beginning of labor that a breech-presentation is desirable and that some other presentation has occurred, as in a transverse presentation in a flat pelvis; but, after external version becomes impossible, internal or bipolar podalic version should generally be preferred.

External Method.—Version by the external method should expose the mother to no added risk, but is liable to be fatal to the child by causing displacement and consequent compression of the cord. It cannot be performed after the presenting part has engaged, nor after the escape of the waters; it is much facilitated by lax abdominal and uterine walls, and by a condition of free mobility of the child, but, under opposite conditions, may be rendered possible by the free administration of an anæsthetic.

If the performance of pelvic version by the external method be determined upon, the bladder and rectum should be emptied—as in all obstetric operations—the patient should be placed upon her back, and the operator should stand by her side, and facing her. After carefully mapping out the position of the child, he places one hand flat upon the abdomen, with its palmar surface as nearly as possible over the sacrum of the fœtus, and the other in the same manner over the forehead; and then, by simultaneous pushing movements of both hands, he endeavors so to change the position of the child as to convert it first into a transverse and then into a pelvic presentation. If a pain comes on during this process all movement of the hands must at once cease, and the operator must direct his whole attention to the attempt to hold what he has already gained. Gentleness and patience are essential to success, as hasty or rough manipulations always excite contractions and so defeat their own purpose. When the breech has been brought to the inlet it must be held there by the hands, or, if this becomes too tedious, by a properly adjusted binder and compresses, until it has become engaged in the superior strait.

The version may sometimes be aided by placing the patient, at the beginning of the operation, upon the side to which the breech is turned; for as the fundus sinks to that side it carries the breech with it, and so tends to move the head toward the opposite iliac fossa.

The subsequent treatment is that of an ordinary breech case.

CEPHALIC VERSION.—Theoretically, cephalic version should be performed in all uncomplicated cases of breech or transverse presentation; in practice it is, however, limited to cases in which the diagnosis is made early, in which there is no necessity for rapid delivery, and in which the other conditions are favorable to the performance of version by the external or bipolar method, for cephalic version by the internal method is usually more difficult and dangerous than internal podalic version.

External Method.—The performance of cephalic version by the external method differs in no way from the description of external version already given under the head of Pelvic Version. If cephalic version be indicated, and the use of the external method be possible, it should always be preferred, as being the least meddlesome and dangerous operation.

Bipolar Method.—In regard both to efficiency and to possible risks, bipolar version occupies an intermediate position between the external and internal methods. The conditions which make external version practicable render bipolar version easy, but it can often be performed when the external method is no longer possible, and with far less interference with the processes of nature than is necessary to the performance of internal version at an early stage of labor. A moderate degree of engagement of the presenting part makes bipolar version more difficult, but is not necessarily a bar to its employment.

Cephalic version by the bipolar method is usually restricted to cases of transverse presentation in which the liquor amnii has not yet drained away and the presenting part is but lightly engaged. A prolapsed arm, unless previously replaced, would prevent its employment. Anæsthesia is not always necessary, but is always an advantage.

Of the various methods which have been proposed, that of Braxton Hicks is alone employed at the present day.

After the bladder and rectum have been emptied, the hand which is of the same name as the position (*e.g.*, O. R. A. = the right hand) is introduced into the vagina, and two fingers are passed through the os to the presenting part, which we assume to be a shoulder; this is gently raised and moved toward the feet by the fingers of the internal hand, care being taken not to rupture the membranes if they are still intact. So soon as the shoulder rises, the external hand begins to press the head toward the inlet until it can be received and guided to the os by the tips of the internal fingers; it is then retained in its new position by the pressure of the external hand, while that which was internal is withdrawn from the vagina and used, if necessary, to complete the version by making upward pressure on the breech through the abdominal wall, as in external version; or the internal hand may be able to retain control of the head, while the other is transferred to the breech.

After the completion of the operation the head must be retained in position by external pressure, as after external version; or, if the os be sufficiently dilated, the membranes may be ruptured, in order to hasten the fixation of the head. The remainder of the delivery is left to nature.

PODALIC VERSION.—Podalic version is indicated in most transverse presentations; in most brow and many face presentations, and in some other malpresentations of the head when arrested high; in some cases of contracted pelvis, often in high arrest of the head in a normal pelvis, whether from inertia uteri or from too tight adaptation; and, in general, under any circumstances which call for the immediate delivery of a high head, unless the use of forceps be preferred.

It may be performed by either the combined or internal methods, but is of course beyond the power of external version.

Bipolar Method.—This operation is not much used in head presentations, because podalic version is now generally followed by immediate extraction, and therefore presupposes a degree of dilatation which admits of the introduction of the entire hand, but it is of value in some cases of placenta prævia in which there is profuse flowing at an early stage of labor. In such cases it is useful, both because it can usually be completed with less loss of time than is consumed in the preparation of the os for internal version, and because, after its completion, the pressure of the half-breech against the os is usually sufficient to control the hæmorrhage until full dilatation has been accomplished. It may, however, be used in any case in which the mobility of the fœtus is unimpaired at the time of operation.

Its performance is rendered more easy by the use of an anæsthetic, which should be given to full surgical anæsthesia.

In this country the patient is usually placed in the lithotomy position, in which case she should lie across the bed, with the buttocks well over its edge. Each leg should be held by an assistant, and the operator should sit between them. The full observance of all possible antiseptic precautions is as necessary as in internal version.

The exact position of the child and its extremities is carefully made out by abdominal and vaginal examination, and, the rectum and bladder having been emptied, the hand of the same name as the position is passed into the vagina until two fingers can be inserted into the os to their full length. The fingers then raise the head and push it gently to the side toward which the occiput is turned, while the other hand pushes the breech by external manipulation in the opposite direction (Fig. 32). This process is continued as long as the head remains within reach of the hand. The fingers are then moved toward the breech in search of a knee, which, unless the normal flexion of the child has been lost, is by this time well within reach (Fig. 33).

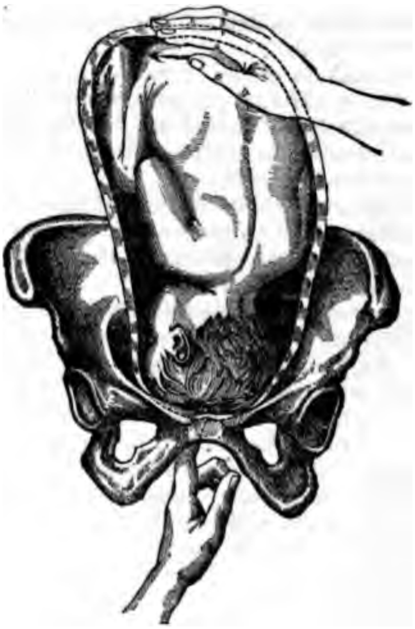

FIG. 32.—FIRST STAGE OF BIPOLAR VERSION (GALABIN).

The knee is distinguished from the elbow by the fact that it points toward the head, while the elbow points to the breech. The presence of the patella may also be recognized in some cases, and, if found, is of course conclusive. If by chance a foot be reached before the knee and surely recognized, it should at once be seized. The foot is distinguished from the hand by the presence of the malleoli and of the prominence of the heel, and by the fact that the great toe is of equal or greater length than the others and placed in the same plane with them, while the thumb is shorter than the fingers and can be opposed to them.

It may sometimes happen that the head becomes extended under the pressure of the internal hand, and thus passes out of reach of the fingers before the external hand has been able to depress the breech sufficiently to bring the knee within their reach (Fig. 34). In this case the fingers next come in contact with the shoulders and chest, which must be urged upward and onward toward the head, while the external hand continues to press the breech down until the knees are within reach. So soon as a knee is recognized, the membranes should be ruptured, if still intact, and a finger hooked around the knee. The hand which has depressed the breech is then applied to raise the head, while the internal fingers draw the knee to the os (Fig. 35).

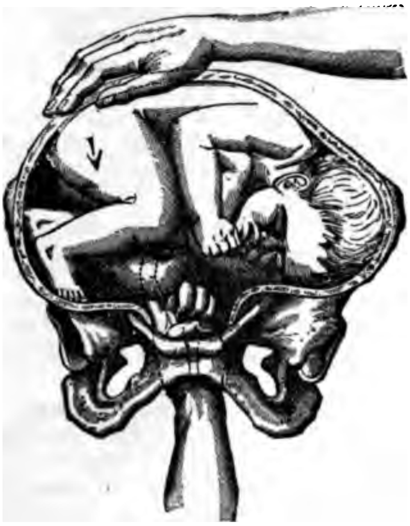

FIG. 33.—SECOND STAGE OF BIPOLAR VERSION (GALABIN).

When the knee is fairly in the vagina and under control, the foot should be brought down and examined, to guard against the possibility that an error has been made by mistaking an elbow for a knee. The version is then completed by traction upon the leg, in combination with external pressure upon the head (Fig. 36).

After the completion of the version, the treatment is that of a ordinary footling case.

Podalic version by the bipolar method is seldom performed in transverse presentations, for, until it has become impossible, bipolar cephalic version is generally to be preferred. In case it is done, the position at the beginning of the operation is that represented in Fig. 34, and the procedure is in every way that which has just been described.

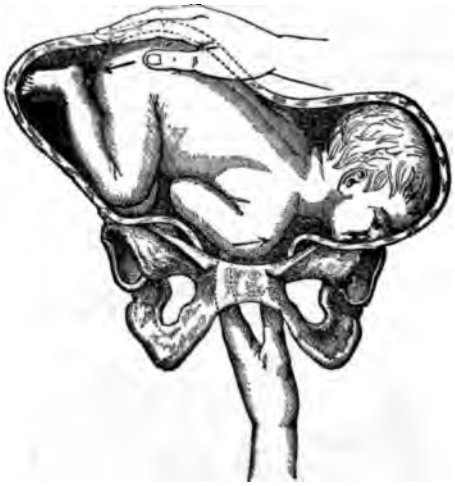

FIG. 34.—SECOND PART OF FIRST STAGE OF BIPOLAR VERSION, WHEN THE HEAD IS EXTENDED (GALABIN).

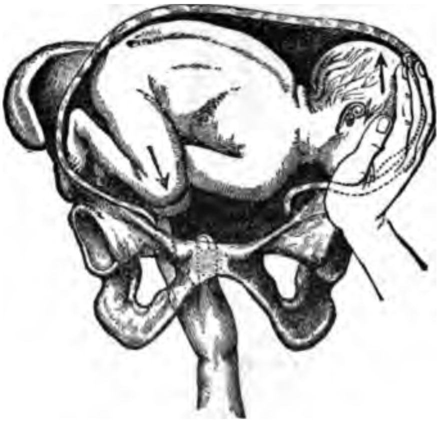

FIG. 35.—FIRST PART OF SECOND STAGE OF BIPOLAR VERSION, WHEN THE HEAD IS EXTENDED (GALABIN).

Internal Method.—This operation differs from those previously described in that its performance presupposes a degree of preparation of the soft parts which permits of an immediate extraction after the completion of the version.

If preceded by artificial dilatation of the os, it is capable of effecting a rapid delivery in almost all cases, and at any period of pregnancy or labor. It is the most generally valuable of all obstetric operations; as Barnes says: "If we were restricted to one operation in midwifery as our sole resource, I think the choice must fall upon turning. Probably no other operation is capable of extricating patient and practitioner from so many and so various difficulties." It is our main operative resource in eclampsia, placenta prævia, concealed hæmorrhage, and many other of the gravest obstetrcial emergencies.

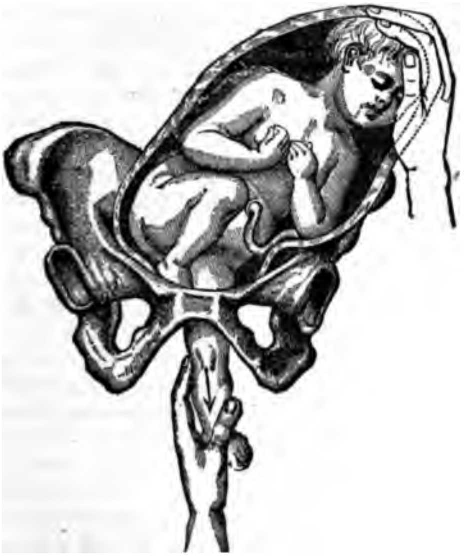

FIG. 36.—THIRD STAGE OF BIPOLAR VERSION (GALABIN).

Internal version is not, however, an indifferent operation. It exposes the mother to grave dangers, both of injury to the tissues by too rough manipulations, and from the introduction of infected material from without. It should not be attempted while the less dangerous methods are possible, nor, in any case, without full antiseptic precautions. When this operation is to be performed, it is a wise precaution to procure the services of a second physician, who should administer the anæsthetic and assist in the extraction by suprapubic pressure.

Before operating, the physician should see that ice, ergot, brandy, a hypodermic syringe, and a sufficiency of hot and cold water are close at hand and in readiness. Several towels and two fillets should be rendered aseptic by immersion in a corrosive-sublimate solution. A similar solution and a nail-brush should be placed where they will be within reach of the operator during the operation. The forceps and catheter should be disinfected and laid at hand. The bed and floor should be protected by rubber sheets, and a blanket should be wrapped around each leg of the patient. If the bed be low, it is better to place the patient during the operation on a table covered with a folded blanket.

The rectum and bladder should be thoroughly emptied, and both arms of the operator should be bared and disinfected to the shoulder. The position of the child should be carefully mapped out by a repetition of the abdominal and vaginal examinations, and its condition should be ascertained by auscultation of the fœtal heart. The patient should be placed in the lithotomy position, and the legs held by assistants.

Internal Podalic Version in Head Presentations.—Everything being ready for operation, the hand of the same name as the position (*e.g.*, O. L. A. = left hand) is well greased with an aseptic lubricant, preferably eucalyptus vaselin, 1:8, upon its dorsal and *not* upon its palmar aspect, and, with the fingers formed into a cone, is passed into the vagina. This should be done slowly and, if the vulva be narrow, by gradual dilatation, the direction of pressure being at first backward and toward the sacrum, but turning forward into the axis of the superior strait as the hand enters the excavation. The cervix should be passed with the same care, and the upward movement continued until the palmar surface of the hand embraces the frontal end of the head.

From the time when the hand enters the vulva, careful counter-pressure on the fundus must be maintained by the other hand of the operator or by a skilled assistant, in order to guard against the danger of rupture of the vaginal attachments of the uterus.

The head is raised by gentle, steady pressure in the axis of the superior strait, until it leaves the inlet and glides into the iliac fossa. The hand can then slip by it into the uterus, but all its movements after it enters the cervix must be slow and gentle, and, in case a pain comes on, they must cease entirely and the hand must be flattened and remain passive while the contraction lasts.

As the hand passes the thorax, it is likely to come in contact with the fœtal hands, and, as the feet may exceptionally be extended into the same region, any extremity which is touched must be examined, and its character determined by the diagnostic marks already mentioned.

If, as is usual, the hand reaches the middle of the body before detecting a foot or knee, it should next search for the cord, both to obtain exact information as to the condition of the child by noting the rate and regularity of its pulsations, and in order to make sure that it is not twisted or looped about the child's limbs or body in such a way that it is likely to be compressed or broken during extraction. If it is found in such a position, it should be gently disengaged and placed by the side of the child and out of harm's way. I have repeatedly seen reason to congratulate myself on having observed this precaution.

When a foot has been reached and recognized as such, it should be grasped, either by encircling the ankle with the thumb and fingers or, better, by seizing the metatarsus with the second, third, and fourth fingers, while the forefinger and thumb encircle the projection of the heel behind the ankle (Fig. 37) which thus lies between the first and second fingers; or a finger may be hooked into the flexure of the knee, if this be accessible. The hand, with the enclosed foot or knee, is then gently withdrawn into the vagina.

A handle for traction having been thus secured, the external hand is withdrawn from the fundus and placed upon the head, and the child is turned by traction upon the foot in the vagina, in combination with upward pressure on the head through the abdominal wall.

The version is complete when the knee appears at the vulva, the head is felt at the fundus, and the examining finger finds the half-breech at the os.

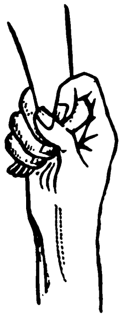

FIG. 37.—METHOD OF GRASPING THE FOOT.

Internal Podalic Version in Transverse Presentations.—This operation differs from internal version in head presentations only in the choice and method of introduction of the hand, in the frequent occurrence of a prolapsed arm, and in the method of raising an impacted shoulder.

In raising the shoulder, it is necessary to remember the mechanism of the method by which nature deals with a neglected transverse presentation—that of spontaneous evolution. In this process the trunk enters the pelvis at the brim in an oblique diameter; but, as it is forced farther down, the shoulder rotates to the front and becomes fixed there, while the thorax and abdomen are crowded into the posterior portion of the pelvis by flexion upon themselves (Fig. 38). Now, so long as the position is still oblique, and if flexion of the trunk has not begun, the presenting part may be easily raised by pressure upon the shoulder in the axis of the superior strait; but so soon as the shoulder has rotated to the front, and the thorax has entered the pelvis, it is essential that the process of relieving the impaction should begin by the return of the part which entered last, *i.e.*, that portion of the thorax and abdomen which still lies opposite the sacro-iliac synchondrosis; and no pressure must be exerted upon the shoulder itself until the trunk again occupies an oblique position. It will be seen that the process of unlocking the impaction is by a direct reversal of the mechanism of spontaneous evolution. Of course, during this whole process the most careful counter-pressure must be maintained at the fundus.

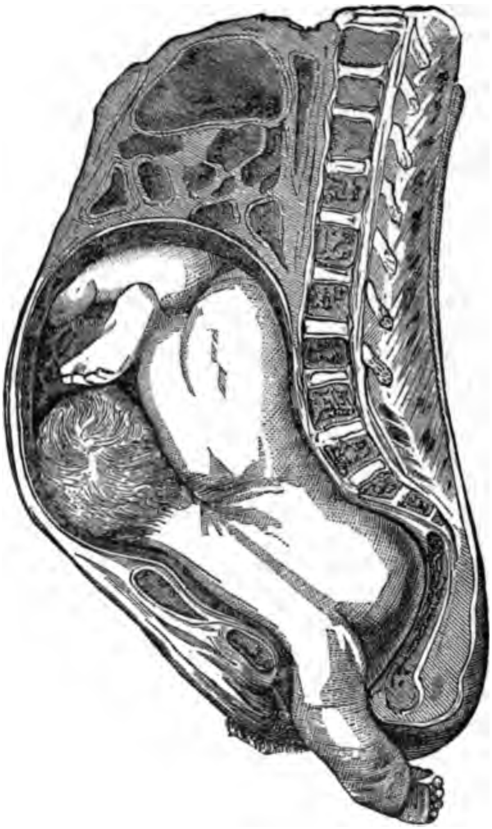

FIG. 38.—NEGLECTED TRANSVERSE PRESENTATION (LUSK).

In simple cases a prolapsed arm may be used as a convenient handle by which to push up the shoulder, and in all cases it is well to begin the operation by noosing a fillet around the prolapsed wrist. This answers a double purpose: it may be used, at first to draw the arm out of the way of the operating hand; and, secondly, during the process of extraction slight tractions on the fillet will prevent the extension of that arm, and thus greatly facilitate the delivery; but care must be taken to remove the noose as soon as possible, for cases are on record in which sloughing of a member has followed the too prolonged or violent use of a fillet.

In the search for a foot two methods may be used. The hand which corresponds to the position—*i.e.*, right position, right hand—may be passed along the back and over the buttocks to the thigh and leg (Fig. 39); or the other hand may be passed across the abdomen and directly to the feet (Figs. 40 and 41). The first is the surest way, and should, as a rule, be preferred, but the latter method is often the easiest, especially in abdomino-anterior positions.

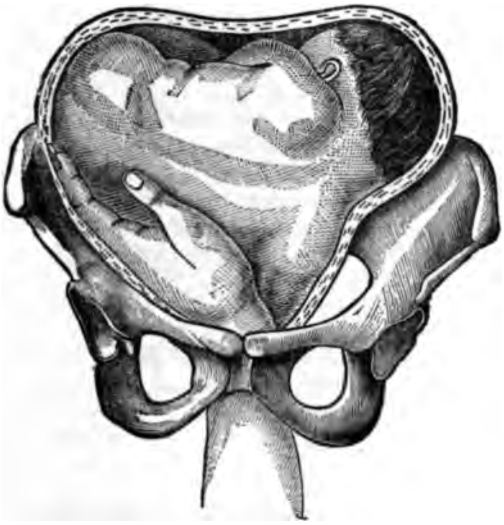

FIG. 39.—INDIRECT METHOD OF SEIZING A FOOT (LUSK).

When the foot is once reached, the remainder of the operation, in easy cases, differs in no way from that already described under Head Presentations.

Much has been written on the advantage to be gained by selecting the superior foot, in version for transverse presentation; but as this view has never obtained much credence outside of England, and as the latest British authority, Galabin, not only disapproves of this practice but gives a very convincing mechanical proof of the fallacy of the theory which prompted it, the subject need be no more than mentioned here.

Unless special care be taken to select the superior foot, the lower is almost invariably seized.

Difficulties and Complications of Internal Version.—The difficulties encountered in version are usually due to one of three conditions: Either to the presence of an imperfectly dilated and rigid os; to partial impaction of the presenting part; or to clasping of the child, either generally by a dry and retracted uterus, or locally by a spastic hour-glass contraction—a constriction ring.

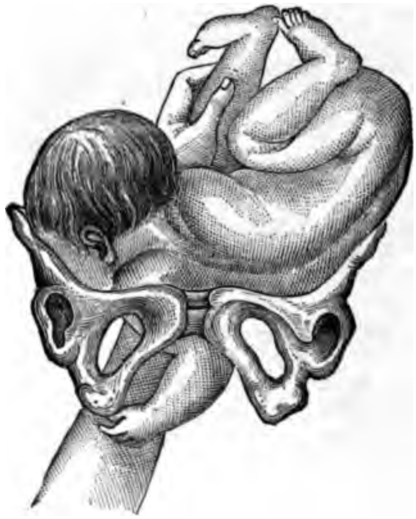

FIG. 40.—DIRECT METHOD OF SEIZING A FOOT (LUSK).

Rigid Os.—When version is indicated in the presence of a partially dilated or rigid os, it must usually be preceded by an operative dilatation by one of the methods which were described in Chapter X. If this operation is to be followed by version, the dilatation should be carried to the highest degree which is possible before turning is attempted, in order to minimize the danger of a reclosure of the os about the neck during the extraction of the child.

Partial Impaction.—A well-fixed head already deeply engaged is usually a case for forceps rather than version. There are, however, many cases of arrest from extended head, or of brow presentation, which are unsuited for forceps and must be treated by version, and in these cases it is essential that flexion should be restored, by pressure upon the forehead, before any attempt is made to raise the head; for not only is the return of an extended head, as such, a practical impossibility, but the restoration of flexion usually unlocks the impaction and makes the subsequent return of the head an easy matter.

The treatment of a practically impacted shoulder has already been described. It only remains to say that in a marked case the operation is always dangerous and should never be undertaken unless in the interest of a fairly vigorous child; for it is always so protracted that there is but a small chance of saving a child whose vitality has already been seriously lowered, while decapitation offers a much safer means of escape for the mother.

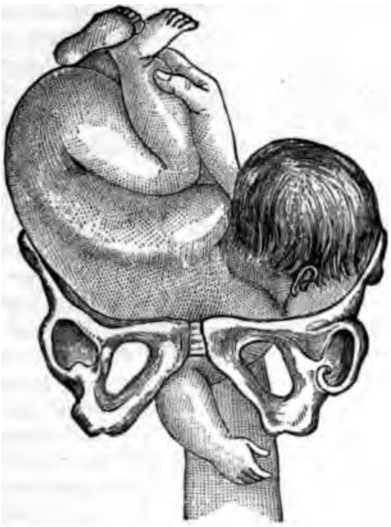

FIG. 41.—DIRECT METHOD OF SEIZING A FOOT (LUSK).

Bandl's Ring.—The performance of version in the presence of Bandl's ring requires even greater gentleness and caution than is necessary in other cases, and careful counter-pressure is also of even more importance; but, apart from this, it presents no special difficulties.

Constriction Ring.[1]—The presence of a constriction ring, on the other hand, is frequently the cause of some of the most troublesome of the difficulties met with in version.

If the hand, after passing the head, finds itself opposed by such a ring, the question of the abandonment of the operation at once arises; and if the ring is so tight that even the fingers fail to pass it without dilatation, this question must usually be answered in the affirmative. If, however, the fingers pass, and for any reason it is decided to persist in version, the ring should be gradually and carefully dilated by the hand, after the manner of a rigid os, until it permits the passage of the hand, after which there is usually no difficulty in drawing a foot into the vagina; but before the foot reaches the vulva its progress is likely to be arrested by the engagement of the occiput in the ring, which now clasps the body of the child with the occiput caught below it, and the half-breech above and to the other side. No progress can now occur until the ring has been sufficiently dilated to permit the escape of the occiput from beneath it, and any attempt to overcome the obstacle rapidly and by force must surely result in rupture of the uterus.

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[1] See pages 118-121.

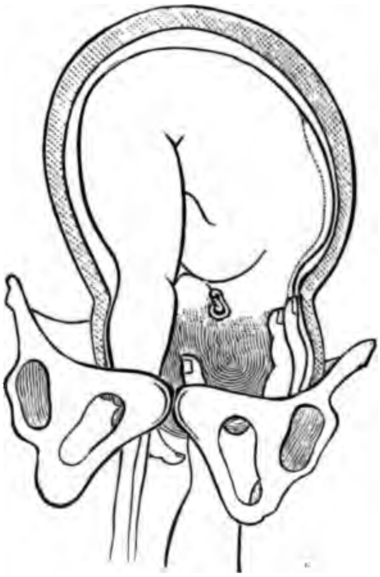

FIG. 42.—VERSION BY COMBINING TRACTION ON THE FOOT WITH UPWARD PRESSURE ON THE OCCIPUT.

The first attempt at release should be by steady, gentle traction on the foot, which, if prolonged for some moments, may gradually overcome the resistance of the ring, and dilate it to an extent which will permit the occiput to rise, after which the breech slips easily through; but if this fortunate result does not occur, the operator must turn to other expedients, of which the best for this case is usually the following: A fillet is noosed around the foot, and, while the disengaged hand makes gentle, steady traction upon this, the hand which was before external is passed into the uterus, grasps the occiput in the palm of the extended hand (Fig. 42), and, by a gentle, pushing movement, attempts to lift it past the obstacle and into the upper part of the uterus; or more may sometimes be gained by repeatedly alternating traction upon the foot with upward pressure upon the head. But neither of these manœuvres should be undertaken unless in the presence of a trained assistant who is capable of making efficient counter-pressure at the fundus.

When the ring is situated about the neck, the above expedient is usually the best, and, if persisted in, will rarely fail; but occasionally it may be better to replace the foot above the ring after the application of the noose, and thus to lessen the tension on the ring before attempting to push up the head with the hand. In this case the disengaged hand should be used to press the breech downward, as in bipolar version; but this method, though sometimes useful, is, on the whole, less powerful than the preceding, and, moreover, exposes the utero-vaginal attachments to somewhat greater risk.

If the ring be situated higher in the uterus, and grasps the breech or body of the child, the foot often comes readily to the vulva, but recedes into the upper part of the vagina as soon as it is released. In such a case it will be found that the fundus turns to one side and descends with the breech into the lower part of the abdomen, but returns to its erect position with the enclosed breech as soon as the foot is released. This difficulty is generally best met by the reintroduction of the hand and the withdrawal of the other leg, after which traction on both legs will usually release the breech.

This expedient is also often of value when a child refuses to turn from general rigidity of the uterus, and in the absence of a constriction ring.

General Retraction of the Uterus.—Version is rarely performed in head presentations in a dry and generally retracted uterus; but as this retraction is in effect merely a combination of the two preceding conditions in a dry uterus, it would be combated by the expedients just described if version was decided upon.

In transverse presentations, however, version is the only conservative operation possible, and it must often be attempted in the presence of a high degree of retraction.

In such a case, if the child refuses to turn after the extraction of a single leg, the second and superior leg should be withdrawn, and traction should be made alternately on one or the other, or both legs. If simple traction fails, it should be supplemented by upward pressure on the presenting part, employed either in alternation with the tractions or coincidently with them, and by the use of a fillet as described above.

In some cases of completely transverse presentation success may be attained, after the failure of the preceding methods, by the application of the following manœuvre. A noose is placed around both feet, and the hand which corresponds to the breech is placed within the uterus with its palmar surface applied to the breech. An assistant then makes counter-pressure upon the head in the direction of the breech, while the operator's external hand makes traction upon the feet and his internal hand presses the breech directly toward the head (Fig. 43). The child is thus doubled upon itself, and the breech is brought into the lumen of the inlet by flexion of the abdomen upon the chest, and, as soon as the breech has fairly entered the superior strait, the head will rise spontaneously to the fundus, or may be assisted to rise by gentle external pressure.

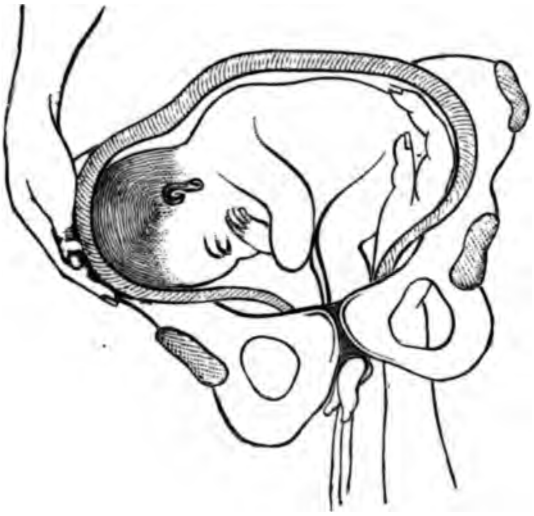

FIG. 43.—AN EXPEDIENT IN TRANSVERSE PRESENTATIONS.

This method, however, is not without its risks to the uterus, and undoubtedly exposes the viscera of the child to some danger of injury from compression.

INDICATIONS FOR VERSION.—Version may be performed in any case of head presentation in which speedy delivery becomes necessary, in the interest of either mother or child, before the head has passed the brim,[1] or in arrest of a head presentation at the brim of a normal pelvis by inertia uteri or excessive size of the head. It is the preferable operation when a brow, or a posterior position of the occiput or face, is arrested at the brim of the pelvis; in head presentations complicated by the prolapse of an arm or foot; and in contracted pelves of the flat type, unless the greatest diameter of the head has passed the conjugate at the brim. It is the only conservative operation which is possible in transverse presentations.

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[1] As in eclampsia, placenta prævia, concealed hæmorrhages, prolapsed cord, etc.

Contra-indications.—Version should never be performed in a justo-minor pelvis, upon the first of twins (unless transverse), or upon a dead child, unless under very favorable circumstances. It is impossible if the head is impacted.

CHAPTER XIII

THE DESTRUCTIVE OPERATIONS.

CRANIOTOMY, DECAPITATION, EXENTERATION.

EMBRYOTOMY.—The term embryotomy properly includes all operations whose aim is to diminish the bulk of the child, in order to decrease the risks of injury to the mother during its extraction; that is, craniotomy, decapitation, and exenteration.

It may be necessary to perform any one of these operations either before or after the death of the child. The responsibility of the decision to sacrifice the life of the child in the interests of the mother is so great that it should never be undertaken without a formal consultation; and even when the child is known to be dead, the physician's care of his own reputation should induce him to demand this protection.

Before the performance of any such operation, the father at least should always be informed of the circumstances of the case; and if the necessity for such an operation arises before the death of the child, it is always fair that the mother as well should be given a full opportunity to avail herself of any religious advice that she may desire before giving her consent to the destruction of her child in preference to the alternative of the performance of an abdominal delivery. The use of ether, though not always necessary to a proper performance of the operation, should always be resorted to, in common humanity to the mother, that she may be spared all recollections of the actual details.

Craniotomy.

INDICATIONS FOR CRANIOTOMY.—During the life of the child, craniotomy is to be performed only when the ordinary conservative operations are impossible, or when they are so dangerous to the mother, and afford so little prospect of saving the child, that they are considered unjustifiable. Since the introduction and widespread success of the modified Cæsarean section, it may also be said that a living child should never be perforated unless the section is contra-indicated or is absolutely refused by the patient. After the death of the fœtus, craniotomy should theoretically be the preferable operation in all head presentations in which interference is necessary; but the prejudice against mutilation of the child is so great that it is ordinarily restricted to cases in which delivery by forceps or version promises unusual risks to the mother.

Craniotomy may be performed upon either the fore-coming or after-coming head. The operation is divided into three stages, perforation of the skull, evacuation of its contents, and the extraction of the head.

Instruments.—The instruments which may be employed in the operation are the craniotomy scissors or trephine, the craniotomy forceps, and a variety of extractors. The choice between the scissors and trephine is mainly one of convenience to the operator. The trephine makes a neater, larger, and more regularly shaped hole, but its complicated construction makes it an extremely difficult and tedious instrument to clean; its bulk, moreover, makes it inconvenient for use upon the after-coming head. The scissors make an irregular hole that is frequently surrounded with small spicula of bone, which, if not removed, may prick or tear the fingers of the operator, or the maternal tissues. It is otherwise a convenient instrument, and one which is readily cleaned. It is as easily used upon the after-coming as upon the fore-coming head, and is therefore generally preferred, since craniotomy is relatively so rare that few physicians care to equip themselves with an unnecessary number of instruments for its performance. The best form of craniotomy scissors is that invented by Simpson and shown in Fig. 45. The craniotomy forceps are merely a large and strong pair of curved bone-forceps, such as are used by surgeons.

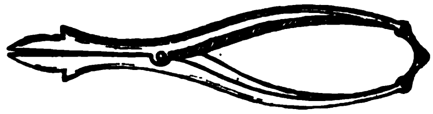

FIG. 45.—SIMPSON'S CRANIOTOMY SCISSORS.

Extraction may be performed by the use of the crotchet, blunt hook, cephalotribe, or cranioclast; it should never be attempted with the ordinary obstetric forceps. The blunt hook and the crotchet are old-fashioned instruments, which take such an uncertain hold upon the skull, and are so dangerous to the mother's tissues, that they have become, or should be, wholly obsolete. Braun's cranioclast, or, as it has been aptly termed by Mundé, craniotractor (Fig. 46), is the only instrument which is capable of affording an entirely secure grasp upon the skull, and is, in addition, when properly used, practically incapable of injuring the mother's tissues; this latter advantage being gained by the fact that one blade is within the cranial cavity, while the other is almost completely buried in the soft tissues of the scalp.

The cephalotribe is in effect a large and powerful pair of obstetric forceps, furnished with a compression screw, and intended to crush the head and thus reduce its bulk by external pressure. It was originally thought that the head could be crushed and subsequently extracted by a single application of the instrument; but it has been found that those cephalotribes whose cephalic curve is sufficiently slight to admit of their effectually crushing the skull are by that very fact rendered liable to slip; and the cephalotribe is used to-day only for the purpose of crushing an already perforated head as a preliminary to the removal of the cranial bones, piecemeal, by craniotomy forceps.

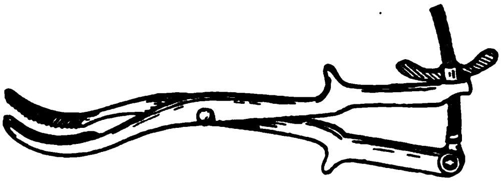
FIG. 46.—BRAUN'S CRANIOCLAST.

CRANIOTOMY TO THE FORE-COMING HEAD—*Perforation.*—The fingers, or the half-hand, should be passed to the head, behind the symphysis, with their palmar surfaces downward. The scissors should be passed along it, and adjusted by the finger tips to a position in which the axis of its point is perpendicular to the portion of the skull against which it impinges, or is directed slightly toward the hand, the latter position being the better, because in the event of its slipping it might then be arrested by the fingers, instead of burying itself in the vaginal wall or uterus. The surface of one of the flat bones should be chosen for perforation, rather than one of the sutures or fontanelles, since the hole is then less likely to be lost. The perforator is forced against the bone by carefully guarded pressure, accompanied by a slight boring motion, and is passed through its substance until its progress is arrested by its projecting shoulders. The catch which holds the handles apart should next be loosened, and the blades separated to the widest possible angle; they should then be closed, and rotated to a position at right angles to the first; again widely opened, and, while still extended, rotated in all directions, in order to convert the hole into the largest aperture obtainable.

If the trephine is preferred, it is best to choose one which is furnished with a cephalic curve; it should be passed to the head under the guidance of the fingers, and throughout the perforation its position should be watched by one hand of the operator, the other steadying the shank of the instrument, while an assistant turns the crank.

The scissors, or, if the operator prefers, some smaller metallic instrument, should next be passed into the head until it comes in contact with the base of the skull, and if possible enters the foramen, and should be swept around in all directions, in order to thoroughly break up the cerebral centres of organic life; since it is important to effectually destroy the life of the child before its delivery, in order to avoid the very unpleasant accident of the birth of a perforated but living child.

Evacuation of the Brain.—In cases where the pelvic space is so extremely small that the head must be reduced to the least possible minimum before its passage, it is well to empty the cranial cavity by washing out the brain with a large stream of water, injected into the interior of the skull with a syringe and a large catheter, or some similar apparatus; but in ordinary cases this precaution is unnecessary.

Extraction.—The medulla having been broken up, one finger of the operator should be inserted into the aperture in the skull before the scissors are withdrawn, as a neglect of this precaution may sometimes lead to considerable difficulty in finding the site of the perforation. The male blade of the cranioclast should be passed through the perforation and its handle steadied by an assistant. The female blade should then be passed over the external aspect of the head. In vertex presentations, this blade should be adjusted, if possible, to the face of the child, which is not only the most solid of the accessible portions of the skull, but is furnished with soft tissues which are more abundant than those of the scalp, and are therefore better able to permit an efficient burying of the external blade in their substance. Should want of space prevent this application, a position over the occiput should be selected, as this is the only other portion of the skull which affords a solid hold for the cranioclast. The male blade should then be so rotated as to permit the locking of the instrument; and the handles should be brought into close approximation by a forcible use of the compression screw; when steady, persistent traction will usually result in an advance of the head, which is immediately signalized by the oozing of the brain substance through the hole in the skull; but during the whole extraction, the operator's fingers should be kept in the vagina and should watch the edges of the perforation, to prevent any tearing of the maternal tissues by projecting spicula of bone. Throughout the extraction the operator should so manage his force, that it may be promptly relaxed, whenever the tissues are felt to be giving away.

DIFFICULT EXTRACTION.—If the pelvic space is markedly small, as compared with the individual skull, it may be necessary to lessen the bulk of the head by deliberate tearing away of the cranial bones, before the extraction is attempted. This may be done by the cranioclast, but is better executed by the craniotomy forceps; which should be introduced under the guidance of the finger, with one blade between the scalp and skull and the other inside its cavity; when by a rotatory movement, under the guidance of the finger, the bones may be successively broken off and removed, piecemeal, until nothing is left but the face and the base of the skull; the soft tissues of the cranial vault being left as nearly intact as is possible, in order to protect the ragged edges of bone, which might otherwise inflict injury upon the vagina and lower uterine segment. The head should then be extended by the hand until the face presents at the brim, when the solid blade of the cranioclast may be introduced into the mouth or below the chin, its other blade applied over the forehead, and the blades approximated by the compression screw until their outer edges are separated from each other by but little more than two inches. Since the width of the base of the skull rarely exceeds three inches, it is evident that by this manœuvre the perforated head may be extracted through all but the most extremely contracted pelves. If, after such an operation, it proves difficult to engage the shoulders in the superior strait, the craniotomy scissors should be passed into the thorax through the supra-clavicular space, and followed by the cranioclast, which should take its grasp over the upper portion of the spinal column. In extreme cases it may be necessary to precede the extraction of the body by a preliminary evisceration, or by an amputation of the arm at the shoulder-joint.

The method above described is usually to be preferred in difficult extractions after craniotomy, but it may sometimes be advantageously replaced by the process of crushing the base of the skull with the cephalotribe after perforation and evacuation of the brain have been performed. The best forms of cephalotribe are those of Hicks, Blot, and Lusk; but this instrument is rarely found except in the hands of specialists engaged in large consultation practice, who need no directions for its use; and its employment is, moreover, so seldom advisable that its further discussion is here unnecessary.

Extraction of the perforated child by version and manual delivery of the after-coming head is occasionally recommended as preferable to the use of the cranioclast, but this is an unsafe operation, the objections to it being that craniotomy is seldom performed while the uterus is in a condition which renders version a matter of indifference in the interests of the mother, and that this operation must always expose the maternal tissues to a considerable risk of injury from the broken cranial bones during the passage of the head along the uterine wall.

It is a convenient precaution to place a pail, partly filled with water, upon the floor beneath the patient's buttocks, in order to receive the usually large amount of blood and brains which pour forth from the vulva; and into this the child may also be dropped after its delivery.

Although the perineum is often necessarily lacerated during the performance of very difficult craniotomies, its preservation is, with care, ordinarily possible; and the importance of this object should never be forgotten. After delivery it is usually best in all but face presentations to so arrange a cap over the child's head as to render it presentable, and prevent unnecessary shock to the feelings of the family—a precaution which should always be recommended to the nurse by the physician.

CRANIOTOMY TO THE AFTER-COMING HEAD.—If, after version or the extraction of a breech, the after-coming head is found to be so firmly arrested as to resist all reasonable efforts toward its delivery by the usual methods, the performance of craniotomy is our only resource. When this becomes necessary, the body of the child must be drawn strongly downward toward the floor by an assistant, in order to engage the head firmly and to bring the occiput within easy reach. Two fingers of the operator are then passed up to the skull behind the symphysis pubis, the craniotomy scissors are guided up to the occipital bone between the fingers and the skull, and are driven through it, the maternal tissues being effectually protected by the operator's fingers.

The operation is ordinarily extremely easy, and the only other precaution to be observed is that care should be taken to see that the point of the scissors has actually reached the occiput before it perforates the skin, in order to avoid the long, tortuous canal which necessarily follows the passage of the perforator through the tissues of the neck and throat, and through which the cerebral substance escapes with much less ease. The extraction of the diminished head may often be accomplished by the application of combined traction to the face and shoulders in the usual manner; but unless this effort succeeds at once, the cranioclast should be placed in position over the most accessible portion of the cranial vault, and used for supplementary traction. It rarely happens that a pelvis which is capable of affording passage to the intact body offers any excessive resistance to the perforated head.

CRANIOTOMY IN FACE PRESENTATIONS.—In face presentations the perforation should be made through an orbit or through the frontal bone; but if the orbit is selected, great care must be taken to pass the perforator well within the cranial cavity before the cranioclast is applied.

CRANIECTOMY.—Many complicated instruments have been devised for lessening the bulk of the head by the removal of portions of the base of the skull; but if this procedure is necessary, it can be equally well accomplished by passing the chain of a powerful écraseur, or the wire of the author's décollator, under the chin of the child, and around the head to the edge of the small fontanelle (Fig. 47). The adjustment of the noose is effected either by carrying it upward over the face upon the tips of the fingers or by the use of a porte-fillet; on tightening the wire the whole face and base of the skull are separated from the remainder of the head.

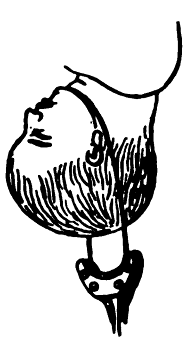

FIG. 47.—REYNOLDS' DECOLLATOR ADJUSTED TO THE HEAD FOR CRANIECTOMY.

Decapitation.

INDICATIONS — INSTRUMENTS.— Decapitation is only indicated in extreme impaction, after long-neglected presentations of the shoulder. Such cases are only likely to arise in the practice of untrained midwives, and are therefore very rare in this country. The steps of the operation are the division of the neck, the extraction of the body, and the extraction of the head. It may be performed by means of Braun's decapitating hook, Ramsbotham's knife, the author's sharp écraseur or, in case of necessity, by an ordinary écraseur, or even with scissors. Braun's hook (Fig. 48) should be made with a metal handle, since the wooden handle with which it is occcasionally provided is extremely liable to split during its rotation. Ramsbotham's knife (Fig. 48) should not be made of very highly tempered steel, since a blunt edge is quite sufficient for the division of the soft fœtal tissues, and a very fine and brittle edge is certain to break upon the bones. Reynolds' decollator (Fig. 49) is in effect a large and powerful écraseur, the distal extremity of which terminates in a crescentic chisel edge, which under the traction of the wire loop is readily forced through the tissues of the neck, the pressure and counter-pressure being applied to opposite surfaces of the child, so that the operation exposes the tissues of the mother to no added strain. It is accompanied by a modification of Ollivier's porte-fillet, intended to assist in the adjustment of the wire around the neck.

TECHNIQUE.—Whenever it is possible, and whichever instrument is used, the operation should be preceded by the extraction of an arm; or, if one is already prolapsed, it should be secured by a fillet and drawn strongly downward, and toward the side to which the breech is directed, by an assistant; in order to make the neck as accessible as possible.

Braun's Hook.—The bladder should be emptied with especial care; the instrument should be passed, under the guidance of the finger, behind the neck, and turned forward until it is in position about the neck, when its point should be met by the finger. The hook should next be drawn strongly downward, and rotated until its tip is buried in the tissues of the shoulder;[1] and then, while strong traction is made upon the handle by both hands of the operator, the instrument should be sharply rotated through an arc of one hundred and eighty degrees, when the neck will be heard to snap. The bladder is protected from injury during this manœuvre by the fact that the point of the hook is already buried in the fœtal tissues, and that it is, moreover, turned away from the bladder.

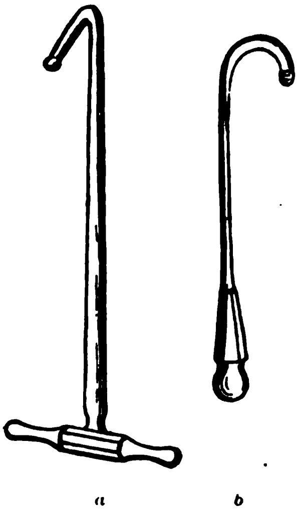

FIG. 48.—*a*, Braun's Decapitation Hook; *b*, Ramsbotham's Decapitating Knife.

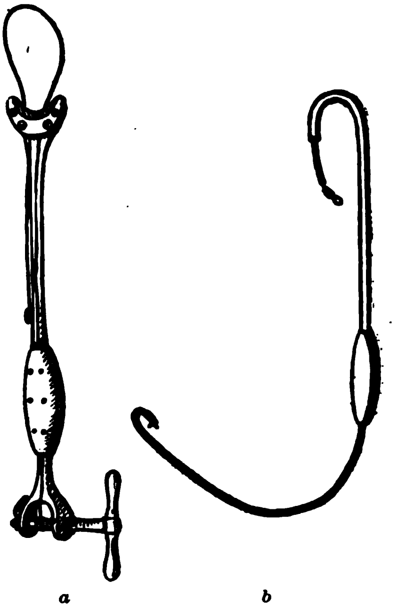

FIG. 49.—*a*. Reynolds' Decollator; *b*, Porte-fillet.

The soft parts are then divided by torsion, the instrument being drawn firmly downward, and rotated until the neck is completely torn away; but throughout this process one hand should be held in the vagina, to guard its tissues from the injury which might be caused by a sudden yielding of the neck.

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[1] Not against the occiput, from the hard surface of which it is liable to glance during rotation.

Ramsbotham's Knife.—The knife is introduced between the neck and symphysis, that its point may be away from the bladder. When it is in position around the neck, its tip is met by the finger, which should be retained in position while the neck is divided by a gentle sawing motion, combined with downward traction.

The Combined Operation.—The objections to the hook are that the division of the soft parts is a prolonged and tedious operation, during which the already overstrained soft parts of the mother are subjected to considerable force from their friction against the surfaces of the child during traction and torsion. The objections to the knife are that, while its division of the soft parts is speedy and almost forceless, it is liable to break against the vertebræ or to cause considerable delay and annoyance in finding an intervertebral notch. If the operator possesses both instruments, a much preferable method of division is to break the neck with the Braun's hook, and, after its withdrawal, effect the division of the soft tissues by means of the knife.

The Knife Ecraseur.—A loop of No. 18 piano wire is drawn into position about the neck by a stout, threaded catheter, or by the porte-fillet supplied with the instrument. The ends of the wire are then secured to the écraseur, and the operator satisfies himself that no maternal tissues are included in their grasp; the wire is put slightly on the stretch, the fingers of the operator's left hand are placed upon the points of the instrument, and his right hand guides the handle; while an assistant draws the instrument into position by turning the crank at its lower end. When the instrument is in position, the division of the neck is accomplished within a few seconds and without the application of any force whatsoever to the tissues of the mother.

In the absence of special instruments, the vagina should be distended by a large Sims' speculum, a stout cord should be passed around the neck, and should be drawn as far downward as possible, under the guidance of the eye. The tissues may then be cautiously divided with a pair of long, stout scissors, continuous traction being maintained on the cord throughout the operation; or after the passage of the cord around the neck, the vagina and cervix may be protected by the insertion of a large cylindrical speculum, the end of which should be placed against the neck, when the head may be separated from the shoulders by a to-and-fro, sawing traction upon the ends of the cord.

EXTRACTION.—After the decapitation has been effected, the cut surface should be protected by covering it with the palmar surface of the fingers, in order to avoid laceration of the vaginal walls by projecting fragments of bone; and the body of the child may then be readily withdrawn, by traction upon the prolapsed arm. The head is then turned into a position in which the divided vertebræ occupy the centre of the lumen of the vagina, and is extracted by the forceps, cephalotribe, or cranioclast, care being take to prevent any rotation which would bring the divided vertebræ into contact with the soft tissues of the mother.

Exenteration.

In transverse presentations where the neck is so high as to be inaccessible, and in delivery of the fore-coming body where the disproportion between the child and pelvis is unusually extreme, it may sometimes be necessary to reduce the bulk of the body by removal of the abdominal viscera before extraction is possible. This should be done by opening the abdominal wall with scissors, passing the hand through the wound and tearing out the liver and intestines. The half-hand should then be passed through one of the natural openings in the diaphragm, and made to tear through its substance; when the heart and lungs can be torn from the thorax. If in transverse presentations the chest only is accessible, the ribs should be severed with the scissors; and care should be taken that their projecting edges are covered, during extraction, by the intervention of the soft parts.

EXTRACTION AFTER EXENTERATION.—In transverse presentations a half-hand or the blunt hook should be forced through the tissues of the back, and hooked around the vertebral column, or this may be grasped by the cranioclast; the child is then extracted by direct traction, which causes the lessened body to bend upon itself. If the space gained by evisceration permits the introduction of the hand into the uterus, and the performance of internal podalic version, without the use of undue force, this should be preferred.

CHAPTER XIV.

THE ABDOMINAL OPERATIONS.

CÆSAREAN SECTION, PORRO-MÜLLER AMPUTATION, LAPARO-ELYTROTOMY.

INDICATIONS FOR THE SECTION.—The Cæsarean section, or any one of the abdominal operations, may be indicated by contraction of the pelvis to a degree which makes the delivery of the child by the natural passages impossible or extremely dangerous; by obstruction due to malignant disease of the cervix; or to immovable, benign intra-pelvic tumors; it may very exceptionally be advisable on account of incomplete atresia of extreme degree.

OPERATIONS.—Among the various abdominal operations for the delivery of the child, but three are worthy of mention in modern obstetrics—the Sänger modification of the classical Cæsarean section, the Porro-Müller amputation of the uterus, and Thomas's operation of laparo-elytrotomy. In the Sänger Cæsarean section, the abdomen and uterus are opened in the median line; the child is delivered, and the uterine wound is closed by deep inter-muscular, and superficial sero-serous sutures. In the Porro-Müller operation the abdomen is opened in the median line, the uterus is opened, and, after the removal of the child, is amputated, with its appendages, at about the junction of the cervix and body, and the stump is then sutured to the lower corner of the abdominal wound. Laparo-elytrotomy is performed by making an incision parallel to Poupart's ligament, stripping up the peritoneum, opening the vagina, and delivering the child through the wound, above the brim of the pelvis.

Prognosis of Abdominal Delivery.—The prognosis of all of the forms of abdominal delivery varies so greatly with the conditions of the individual case that it is impossible to form a true conception of its gravity, or to indicate the line of conduct which should be pursued in determining the choice between perforation and each of the forms of abdominal delivery, without first considering the consequences of the latter operations when performed at the time of election, and late in labor. The conditions which predispose to a high mortality are the existence of exhaustion from prolonged labor; the presence of debilitating organic disease on the part of the mother; and lastly, but most important, the existence, or not, of previous attempts at delivery per vaginam.

CÆSAREAN SECTION.—The recent improvements in the technique of abdominal surgery, and Sänger's introduction of an accurate adaptation of the uterine wound by sero-serous sutures, have greatly lowered the former enormous mortality of the Cæsarean section: but even this operation, when performed late in labor, and after unsuccessful attempts at extraction by version, forceps, or perforation, has resulted in a mortality of 40%. Upon the other hand, in a recent[1] analysis of the literature of the world, conducted with the idea of determining the prognosis of this operation under favorable conditions, it was discovered that up to August, 1888, thirty-nine Cæsarean sections had been performed by thirty operators under the following conditions: The performance of the operation, during the first twenty-four hours of labor, in the absence of maternal disease other than deformity of the pelvis, uncomplicated by previous attempts at extraction by the natural passages, and with the use of sero-serous sutures. The result of these thirty-nine sections under favorable conditions were that all the mothers recovered; and that of thirty-nine children who were alive at the beginning of the operation thirty-eight were saved;[2] the fœtal death rate being thus much less than can be claimed for any other of the serious obstetrical operations, and the maternal mortality absolutely nothing; and this, in spite of the fact that the majority of the operators were performing this operation for the first time. The difference in mortality between early and late interference by the Cæsarean section is thus so great that the importance of avoiding delay and attempts at inter-pelvic extraction, in cases which are like to require the section, cannot be too strongly urged upon the profession.

PORRO-MÜLLER AMPUTATION.—Although the statistics of the Porro-Müller operation are greatly influenced by the time of its performance, the shock of the operation is at best so much more severe than that of the Cæsarean section that it is but seldom performed till late in labor, and has been almost uniformly reserved for desperate cases in which the condition of the uterine tissues is such that it is unwise to allow them to remain. Its mortality in all the reported cases is about 46%.

LAPARO-ELYTROTOMY.—Thomas's operation has so far been performed only fourteen times. Six cases were operated upon early in labor and in the absence of organic maternal disease. Six children were saved, and five mothers; one died of septic peritonitis on the eighth day. Laparo-elytrotomy in favorable cases has then yielded a death rate of 16.6%; but the number of cases is extremely small, the only death was from a cause which it should be possible to prevent, and we may hope that in the future its record will be greatly improved. Of the remaining eight cases which were operated on under unfavorable circumstances, one had been forty-eight hours in labor, craniotomy had been performed, and the patient had a feeble pusle of 130; one had cancer of the recto-vaginal septum, was intemperate, and died delirious; a fourth was in feeble health, and œdematous; a fifth was moribund at the time of operation; the sixth had been a week in labor and died of septicæmia; all six mothers were lost. The two remaining cases, though unaffected by disease, had been in labor, respectively, four days, and a week; the latter case had been subjected to craniotomy, and the child had been allowed to remain in utero until it was putrid; yet both mothers and the living child recovered. Nine of the fourteen children were alive when the operation was undertaken; two were delivered living, but died within a few days; seven were saved. Out of seven almost desperate cases, the operation has thus saved two mothers, or nearly 30%, and half the children.

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[1] Still unpublished.

[2] Dr. R. B. Harris permits me to state that although he has not had occasion to pursue this special investigation into the statistics of the subject, its results are in in a general way in thorough accord with those of his own researches.

Technique of the Abdominal Operations.

The Cæsarean Section.—The necessity for the operation should be determined if possible by careful measurements of the pelvis, and by estimation of the size of the head, before labor begins, or during the first stage. No attempts at delivery *per vias naturales* should be permitted; the vagina should be thoroughly douched at the beginning of labor with a 1:3,000 corrosive-sublimate solution or with a 1:40 creolin emulsion; it should then be exposed with a Sims' speculum, its walls should be thoroughly scrubbed with a wad of absorbent material soaked in the antiseptic solution and a somewhat larger wad wet with the solution should be placed in the vagina, and should remain in position until the time of operation. The section should not be undertaken until the os has become dilated to the size of a silver dollar; since it is highly important that the cervix should remain sufficiently patulous to permit the free escape of the fluid during at least the first forty-eight hours after labor. The abdomen should be thoroughly scrubbed with hot soap and water; dried; and scrubbed with ether to remove the fatty secretions of the skin; scrubbed with creolin or corrosive sublimate; and covered with a large pad wet with the same antiseptic solution, which should remain in position for from eight to ten hours. The instruments, the sponges, and the hands of every one who is to approach the patient should be rendered thoroughly aseptic.

The operation has been performed successfully by the light of a tallow candle and with one untrained assistant; but the best of light and the presence of at least four trained assistants are much to be desired. The patient should be laid upon a table, and her whole body warmly wrapped in blankets, the abdomen only being exposed. Everything in the immediate neighborhood of the abdomen should be covered with towels wet with a 1:40 carbolic-acid solution; the operator should stand upon the right side of the patient, with the instruments upon a table near his left elbow. The first assistant should stand opposite; the second should stand behind the first and should assume the care of the sponges; the third should etherize; and the fourth should hold himself in readiness to perform any service that may be required of him during the operation, and to take charge of the baby after it is delivered.

Instruments.—Twelve round, and twelve thin, flat sponges of selected sizes should be provided.[1] The instruments necessary are knives, scissors, dissecting forceps, retractors, six to twelve small compression forceps, needles and needle holder, a Kœberlé serre-nœud or some écraseur which can be used as a substitute for it in compressing the pedicle, pins for transfixing the stump, a thermo-cautery, a sheet of rubber gauze, and a piece of large, soft rubber tubing, or preferably the elastic band which is supplied with Esmarch's rubber tourniquet.

The bladder and rectum should be carefully emptied. The incision should be made about an inch to one side of the linea alba, and should extend from about the umbilicus to within one and one-half inches of the symphysis pubis; if the woman is at term, it must be at least seven inches long; and if it is necessary to enlarge it, the extension should be upward. The skin and cutaneous fat should be divided by bold, free sweeps of the knife; the sheath of the rectus muscle should be divided, and its fibres separated with the point of a director or the handle of a scalpel; bleeding points should be compressed with catch forceps; and the posterior sheath of the rectus, and the transversalis fascia should be carefully divided. The subperitoneal fat should then be separated with a blunt instrument, when the peritoneum may be recognized as a thin, transparent membrane which can be readily moved to and fro over the uterus, which is faintly visible through it. The peritoneum should be raised with a pair of dis-

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[1] The sponges may be advantageously replaced by bags of cheese-cloth of proper size and shape, loosely filled with Berlin worsted which has been rendered absorbent by prolonged boiling in soft soap and water, or in a solution of dilute caustic potash.

secting forceps, care being taken that nothing else is included in their grasp; and a small incision should be made, when the escape of a little fluid will demonstrate the fact that the peritoneal cavity has been opened. The incision should be slightly enlarged with a knife or pair of scissors; and the finger should be introduced, and used as a director on which to extend the incision in the peritoneum to the full length of the cutaneous incision, care being taken that the bladder is not injured in opening the lower angle of the womb. The fingers and thumbs of the first assistant should then be placed around the lower uterine segment, beneath the head of the child, or the elastic ligature may be made to surround it, in order to exert compression if it should be necessary. The uterus may then be opened *in situ*, or the abdominal wound may be extended upward, and the uterus lifted from the abdomen through the incision. In either case the hands of the unoccupied assistant should carefully hold the abdominal parietes in apposition with the uterus, in order to prevent extrusion of the intestines, and the entrance of liquor amnii into the abdomen. If the uterus is lifted from the abdomen before it is opened, the contamination of the cavity by blood and liquor amnii may be effectually prevented by cutting a hole in a sheet of thin elastic rubber, and drawing it over the uterus, in imitation of the dam commonly used by dentists.

The uterus should be incised in the median line, to a length of about six inchs, the ends of the cut being about equidistant from the fundus and cervix, both of which should be avoided on account of their greater vascularity. If the hæmorrhage is not excessive, compression of the lower uterine segment should be avoided in the interests of the fœtus and of the maternal tissues; but if the incision bleeds profusely, the uterine circulation should be arrested by digital compression of the circumference of the lower segment in the space between the head and pelvic brim, or by the elastic ligature; the incision must then be completed rapidly. If the membranes present in the incision, they should be ruptured; if the placenta presents, it should be peeled off, or the fingers passed through its substance, and the child seized, if possible by the head, and rapidly extracted; if the head is inaccessible the feet should be seized, and the child should be turned and delivered. The cord should be torn, and the child handed to an assistant who is competent to deal with asphyxia. The placenta should be at once manually extracted, when the uterus will usually contract promptly. A hypodermic injection of ergot should be given; the uterine cavity should be emptied of clots and, if hæmorrhage continues, should be swabbed out with dilute acetic acid, tincture of iodine, or, in extreme cases, with a dilute solution of persulphate of iron (Monsel's solution).

The abdominal cavity should be cleansed with sponges attached to sponge-holders and passed to the bottom of Douglas's fossa, or by the injection of a gallon or more of warm boiled water.

The uterine wound should be closed by interrupted intermuscular, and superficial sero-serous sutures of aseptic silk or catgut (Fig. 50). The peritoneum should be drawn slightly toward the wound on either side, deep sutures of medium-sized silk or catgut should be inserted at from one-fourth to one-third of an inch from the edge, and should pass through the entire thickness of the uterine wall, with the exception of the mucous membrane, to emerge at a similar distance upon the other side. These should then be tied, care being taken at the time to see that the peritoneal edges are turned into the wound and lie in apposition; where they should be held by interrupted superficial sero-serous sutures of very fine silk or catgut, placed no more than half an inch apart; the uninterrupted suture is ill adapted to the closure of the uterine wound, since the shortening of the wound which occurs with each contraction of the uterus must necessarily loosen any continuous suture. The abdominal cavity should be again cleansed by a copious injection of warm water, and the abdominal wound closed by silk or silver-wire sutures. A dry antiseptic dressing, a tight binder, and the usual obstetric vulvar pads should be applied, and the patient should be put to bed and warmly covered.

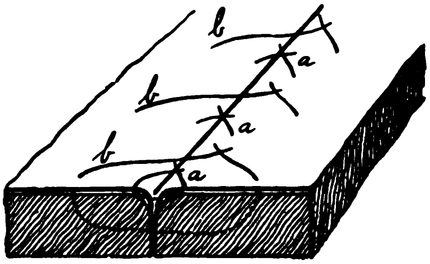

FIG. 50.—SUTURE OF UTERINE WOUND. *a*, Sero-serous suture; *b*, intermuscular suture.

A special nurse should be provided, who should never leave the patient alone for an instant during the first ten days or a fortnight; since many cases have been reported in which death was due to separation of the wound, or to internal hæmorrhage, caused by the patient's sitting up in bed or rising from it during a temporary absence of the nurse.

If the recovery from ether is followed by excessive vomiting, it should be treated by the frequent administration of very small (one- or two-drachm) doses of strong black coffee, or champagne, or of brandy poured upon cracked ice; in case of need, a dose of morphia may be administered hypodermically. The bowels should be moved in most cases upon the second day, and preferably by a saline cathartic; until a free dejection has been secured, the diet should be confined to liquid and farinaceous articles; after that it should be gradually, but rapidly, increased to full diet. Should peritonitis appear, it is best treated by the administration of salines.

PORRO-MÜLLER OPERATION.—The steps of this operation are exactly similar to those of the Cæsarean section until the time for the introduction of the uterine sutures arrives, except that the uterus is always lifted from the abdomen, and that the constricting band of Esmarch is placed about the cervix, and used instead of digital compression, since laceration of the superficial tissues is here of small importance. After the delivery of the child and placenta, the wire loop of a Kœberlé or other pedicle compressor is arranged below the rubber ligature, care being taken that the whole substance of the broad ligaments is included, and that the bladder is entirely free of the wire. The loop is then drawn so tightly about the pedicle as to produce a distinct constriction; laceration of the peritoneum is to be avoided. The long steel pins provided with the instrument are then passed through the stump at right angles to each other, and below the wire; the rubber ligature is removed, the stump is trimmed off to within a half an inch of the wire loop, its surface is scorched with a Paquelin cautery, and the point of the latter is passed downward into the cervical cavity, in order to destroy the secreting surface of the mucous membrane. The stump is then carefully secured in the lower angle of the wound by deep sutures, the abdomen is thoroughly cleansed, and the remainder of the abdominal wound is united. The operation is especially well adapted to cases in which the uterus is septic when the delivery is undertaken. The after-treatment is tedious, on account of the prolonged suppuration which is usually consequent upon the sloughing of the constricted portion of the pedicle.

LAPARO-ELYTROTOMY.—The incision is usually made upon the right side, but this is not important. An assistant stands at the left of the patient's chest, lays his flat hands upon the skin above the right iliac region, and puts it firmly on the stretch. A slightly curved incision is made through the skin, beginning at a point one and three-quarter inches above and outside the spine of the pubes, and extending an inch above Poupart's ligament, and parallel to it, to a point an inch above the anterior superior spine of the ilium. The dissection is carried down to the surface of the external oblique muscle; this, with the internal oblique and the transversalis, is divided by a similar incision of equal length. The transversalis fascia is then opened, great care being taken to avoid the peritoneum, which lies directly beneath it, but separated from it by an areolar tissue, and sometimes by subperitoneal fat. The peritoneum is then carefully separated from the abdominal wall by gentle traction with the pulp of the finger until the vaginal wall is reached.

The first assistant draws the uterus vigorously upward and to the left, in order to bring the upper part of the vagina more prominently into the wound; and a second assistant protects the exposed peritoneum from undue traction, by compression of the upper side of the wound with a warm, sterilized towel. A metal catheter is introduced into the bladder, and held by an assistant in such a direction that its upper part defines the line of separation between the bladder and vagina. The vagina is distended from below with a wooden plug or speculum; a small incision is made into it with the cautery or with some blunt instrument, at a point well below the junction of the vagina and bladder and at about the middle of the lateral vaginal wall, this spot being selected in order to avoid the infliction of injury upon the ureters. The vaginal incision is extended forward and backward, by upward and downward traction on its edges with the index fingers, care being taken that the laceration does not extend too far toward the bladder or ureter. The catheter and vaginal obturator are now withdrawn, the cervix is dilated and directed as much as possible into the wound, and the os is hooked upward with the fingers.

The child is then extracted through the os and wound by simple pressure or by the forceps; the placenta is expelled by compression, and is withdrawn through the vagina or wound. Bleeding from the wound is to be controlled by catch forceps or ligatures, access to its deeper portions being rendered possible by the use of retractors.

The bladder or ureter is not infrequently torn during the extraction of the child, and it is an essential step in the operation to inject the bladder with warm, colored water, or milk, immediately after the delivery, when the existence of any wound will be demonstrated by the escape of the fluid. If a fistula exists, it should at once be secured by sutures.

The edges of the wound should be secured by sutures, a drainage tube should be passed from the abdomen to the vagina through its median portion, and antiseptic dressings applied to the abdomen and vulva. It is apparent at a glance that the successful performance of the operation requires a very high degree of technical skill in the operator.

CHOICE BETWEEN THE OPERATIONS.

This must depend on the conditions in accordance with which the operation is decided upon. Any one of the abdominal operations may be performed (*a*) in the interest of the child exclusively, the mother being already dead or her condition hopeless; after the death of the child, in the interests of the mother only, and (*c*) in the interests of both patients.

SECTION IN THE EXCLUSIVE INTERESTS OF THE CHILD.

The operation may be indicated, for the sake of the child, either in case of the actual or immediately impending death of a woman pregnant with a living and viable child, or when a woman who is the subject of a cancer of the cervix reaches a state in which she is manifestly unlikely to live many days, the child being alive and viable.

When the mother is actually dead from accident or acute disease and the child is still living, there can be no question but that every consideration of expediency and morality demands the immediate delivery of the child by the most rapid method possible, *i.e.*, by incision through the abdomen; but unfortunately it is in practice rarely possible to establish the death of the mother beyond the possibility of a doubt until after a delay which must greatly lessen the child's chances of survival. For this reason the action of the physician must be regulated by his own confidence in his diagnosis of death, and by the attitude of the family with regard to the question. If the circumstances are such that both physician and family are persuaded of the certainty of maternal death, the Cæsarean section should be performed upon the instant; but the several steps of the operation should be performed with the same exactitude which would be appropriate to an operation upon a living subject, since in the event of the revival of the patient it would then be proper to insert the uterine sutures, make the toilet of the peritoneum, sew up the abdominal wound, and thus afford the woman a fairly good prospect of ultimate recovery.

When there is every probability that the patient is dead, but the diagnosis is not established beyond the possibility of a doubt, the child should be delivered by rapid manual dilatation of the os, version, and extraction; because, although this operation is less favorable to the child than delivery by abdominal incision, it is still likely to save a considerable proportion of the children, involves in all probability a somewhat decreased risk to the mother, and will be much more readily consented to by the family.

When, in cases of advanced cancer, it becomes evident during the latter months of pregnancy that the mother is unlikely to survive until term, and that the obstruction is so complete that the Cæsarean section will certainly be required should labor set in, and, from her condition, will certainly result fatally, it may sometimes be proper to perform the operation while the mother is still living, and before the appearance of labor, for the sake of extracting a child whose vitality is undiminished by the suffocation which must follow the cessation of the maternal circulation.

It seems improbable that the child can live more than a few moments after the central death of the mother; but since several cases of the delivery of living children, by an operation performed fifteen or twenty mintues after the maternal death, have been credibly reported, it should certainly be undertaken if the patient is seen by a physician within that time. Moreover, the few cases in which the delivery of a living child has been reported to have occurred after the expiration of two or more hours from the maternal death should lead to the performance of the operation at any time within the first three hours, since, though the child is then probably dead, it is certain that no harm can be done to the mother.

(*b*) SECTION IN THE INTEREST OF THE MOTHER ONLY.—After the death of the child, abdominal delivery is indicated only in cases in which the obstruction to the natural passages is so extreme that there is no possibility of extracting the child by craniectomy and evisceration; or in which these operations, though possible, would be so protracted and difficult as to be in all probability more dangerous than the section.

The choice between the abdominal operations must depend on the condition of the mother. If the case is seen before exhaustion has set in, the choice between the Sänger section and laparo-elytrotomy must be determined partly by the condition of the os and partly by the previous training of the operator. Laparo-elytrotomy is technically an extremely difficult operation, and its success has in all probability been largely due to the fact that it has up to this time been performed only by gynæcologists of recognized ability. The technique of the Cæsarean section is, upon the other hand, extremely easy; and this consideration should be quite enough to determine the choice of an inexperienced surgeon. Laparo-elytrotomy is inadvisable unless the os be already fully dilated, or dilatable; the time of election for the Cæsarean section is when the os has attained the size of a silver dollar.

After the appearance of exhaustion, or if craniotomy has been already performed, the choice rests between the Porro-Müller operation and laparo-elytrotomy. The Porro-Müller is decidedly the simpler operation, and does not require a full dilatation of the os; laparo-elytrotomy is the operation of choice in cases where the retraction of the uterus is so extreme that the head has already partly escaped from the os and is restrained only by the pelvic bones; in all other cases the Porro-Müller amputation is to be preferred.

(*c*) SECTION IN THE INTEREST OF BOTH PATIENTS.—This class of indications must be divided into two headings: (1) During the life of the child when delivery by the natural passages is impossible; no resource but abdominal delivery is then possible, and the choice of operation is influenced by the considerations which have just been detailed. (2) During the life of the child, in cases in which the risks of craniotomy for the mother are thought to be greater than those of the section; or when an abdominal section is undertaken at the time of election, in the belief that its maternal mortality is now so low that its selection is justified by the prospect of life which it offers to the child, even though it may not be the operation of election for the mother.

The first indication admits of no question; the second, the so-called relative indication for the section, is still the subject of an active controversy in the profession, and must be regarded as not yet definitely settled; but all who have frequently been compelled to the revolting necessity of perforating a living child must agree in an earnest hope that the immediate future may produce a general consensus of opinion in favor of the performance of the section. This happy result can only be procured by the performance of a still more considerable number of operations under the favorable conditions which have been referred to; and it should be impressed upon the profession that when the general practitioner finds himself confronted by pelvic deformity or other obstructions of extreme degree, he should invariably avoid any resort to attempts at delivery of the child by version, the forceps, or craniotomy, since they are, if unsuccessful, not only useless, but more harmful to the interests of both patients than any other possible procedures.

The question between a primary resort to the Cæsarean section at the time of election and the performance of the more ordinary obstetrical operations is one which always involves the heaviest of responsibilities; which can be determined only by the most careful estimation of the size of the child and of the mother's pelvis; and which should be submitted at once to the most competent authority who is within reach of the case.

After long labor and unsuccessful attempts at instrumental delivery, the risks of the section are so enormously increased that few English-speaking obstetricians will deny the right of the mother to preserve her own life by sacrificing the child; the life of one woman who has reached maturity being far more valuable to her family and to the community, than is that of an unborn child, which, even if it is delivered living, must pass through all the perils of childhood before it can attain a position which is equivalent to that already occupied by its mother.

Sterilization During the Section.—Although the Cæsarean section has been performed successfully in successive pregnancies in several instances, there are probably but few patients who would voluntarily choose to enlarge their families in the face of such risks as it offers; and it has been generally urged as one of the advantages of the Porro-Müller operation that the occasion for its repetition can never occur. The question of the advisability of a sterilization of the patient during the performance of the Cæsarean section has also been raised, and the operation has been performed in several cases.

Sterility may be secured by the removal of the Fallopian tubes and ovaries after the closure of the uterine wound; by ligature of the tubes; or by inverting their free ends, and securing the peritoneal surfaces thus brought into apposition by one or more sero-serous sutures. The objection to the excision of the appendages is that many operators think it unwise to complicate so serious an operation as the Cæsarean section by the shock of their removal; the objection is theoretical: its existence or non-existence as a fact has not yet been determined. The closure of the tubes by ligatures is distinctly objectionable, since the secretion of the portion which is outside the thread is then likely to be forced into the abdominal cavity, and this accident would probably result in the production of a pelvic peritonitis. Inversion of the ovarian end of the tubes is attended by no disadvantages, except the trifling prolongation of the operation which would be required.

PART IV.—ABNORMAL LABOR.

CHAPTER XV.

LABOR IN POSTERIOR POSITIONS OF THE VERTEX.[1]

PHYSIOLOGY AND MECHANISM OF LABOR IN POSTERIOR POSITIONS OF THE OCCIPUT.—Labor in posterior positions is usually longer and more difficult than when the occiput is anterior. Even if the head is well flexed throughout the labor, it is apt to enter the brim less easily, and the second stage is necessarily rendered longer by the greater amount of rotation which is necessary before the occiput can appear at the arch. There is, moreover, always a strongly marked tendency to the occurrence of extension; and this when it occurs greatly prolongs the labor and exposes both mother and child to increased danger from compression of the maternal soft parts and the fœtal head. If the extension be well marked, the delivery usually requires the intervention of the obstetric art. In the few cases in which forward rotation does not occur, and the head is delivered face to pubes, the prognosis becomes still worse for both patients.

PASSAGE OF THE BRIM.—The difficult entrance of the head is due to the fact that it presents at the brim by less favorable diameters. In anterior positions the large bi-parietal diameter is in correspondence with an oblique line (the pubo-sciatic diameter) which is parallel to one of the oblique diameters of the pelvis, and nearly equal to it in length (Fig. 51), while the sacro-cotyloid diameter is occupied by the smaller bi-temporal. In posterior positions, on the other hand, the bi-parietal is ordinarily opposed to the short sacro-cotyloid diameter, while the lesser bi-temporal occupies the oblique. When extreme flexion is present from the time of engagement, the bi-parietal may occupy a somewhat more favorable diameter than the sacro-cotyloid, and the head will pass the brim without marked delay; but in the majority of cases the head approaches the brim in a but slightly flexed position, and under these circumstances the sinciput, meeting little or no opposition, tends to descend, while the occiput is arrested by the greater obstacle which is opposed to it. This at once produces extension and results in the opposition of the long occipito-frontal diameter to the oblique diameter of the pelvis. Any further descent of the forehead is then prevented by its pressure against the lateral walls of the pelvis, and no further progress of any kind can take place until the descent of the occiput re-establishes flexion. If the head be large or the pelvis anything but ample, the delay due to extension not infrequently persists until exhaustion of the uterus sets in; but if the adaptation be easy, the impaction may eventually be relieved by the passage of the occiput, when the remainder of the head will promptly pass the superior strait.

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[1] See footnote to page 91.

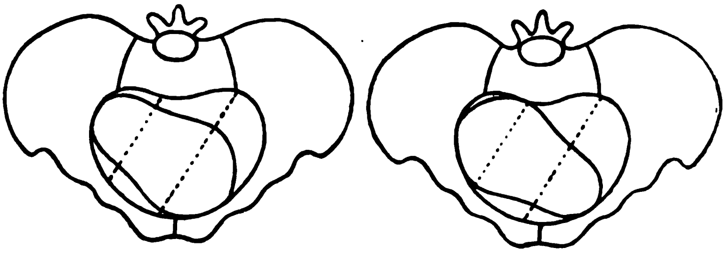

FIG. 51.—DIAGRAMS ILLUSTRATING THE DIFFICULT ENTRANCE AT THE BRIM IN POSTERIOR POSITIONS.

PASSAGE OF THE EXCAVATION AND OCCURRENCE OF ROTATION.—After the head has escaped from the superior strait the occiput moves backward into the hollow of the sacrum, when the greater antero-posterior diameters of the excavation frequently permit a partial descent of the sinciput, while the occiput is arrested by impingement upon the forward curve of the lower part of the sacrum and coccyx. When this second movement of extension occurs the head is again jammed across the pelvis by opposition of the long occipito-frontal diameter to the antero-posterior diameter of the inferior strait, while rotation is prevented by the fact that both ends of the cephalic lever are sufficiently low to receive the influence of the forward thrust, due to the inclination of the lower portion of the posterior pelvic wall, and, as before, progress is then absolutely arrested until flexion reoccurs. This may exceptionally take place under the efforts of nature, but in the lower portion of the pelvis it almost invariably necessitates the interference of the obstetrician.

Should good flexion persist, or, after its re-establishment, rotation takes place under the same forces which are active in anterior positions, though it must be noted that the influence exerted upon the sincipital end of the head by the anterior wall is here much more marked (Fig. 52). When partial rotation has been effected, the mechanism is of course that of anterior positions.

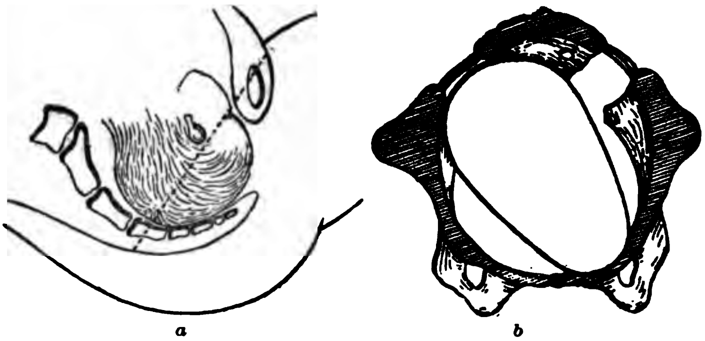

Fig. 52.—Diagrams Illustrating Rotation in Posterior Positions. *b*, Is a section through dotted line in *a*.

Expulsion Face to Pubes.—In a very few cases it may happen that the head reaches the pelvic floor with the occiput so far posterior as to be reflected into the median line posteriorly, by the pressure of the walls of the gutter which is formed by the

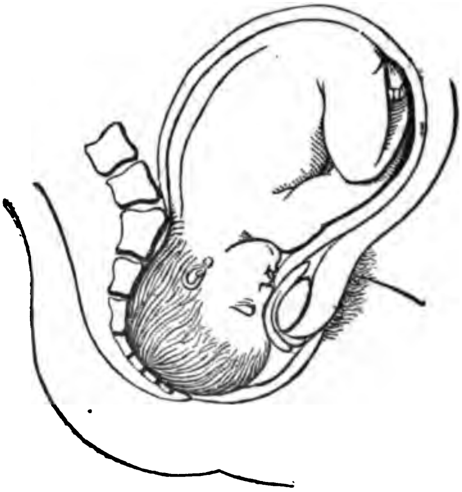

Fig. 53.—Expulsion, Face to Pubes.

extreme lower portion of the sacrum and the lateral portions of the fibro-muscular pelvic diaphragm. Delivery by the efforts of nature or by the force of the forceps is then difficult, and is only possible after the production of extreme flexion. If the contractions of the uterus are powerful and the adaptation not too tight, the occiput is pushed bodily forward by the shelving pelvic floor (Fig. 53), while the sinciput is restrained by the opposition of the anterior pelvic wall. Extreme flexion is thus produced, and the occiput is urged forward until the occipital protuberance appears at the vulva; the perineum then retracts from the nape of the neck, and the occiput being free from pressure, while the sinciput is still exposed to the influence of the intra-uterine forces, extension occurs, and the face sweeps out under the symphysis. This process, however, requires for its completion such extreme compression of the frontal end of the head against the pubes that the child's life is not infrequently sacrificed in its delivery. The perineum is, moreover, exposed to such extreme tension that laceration is rarely avoided.

The conditions which favor rotation are the existence of sufficiently strong pains, the presence of good flexion, an adaptation between the head and pelvis which is neither too slight nor excessive, firm soft parts, and abundant vaginal secretions; while the opposite conditions tend to prevent it.

MANAGEMENT OF POSTERIOR POSITIONS.

MANAGEMENT OF THE PASSAGE THROUGH THE SUPERIOR STRAIT.—The first essential in the management of posterior positions is the employment of every means to promote and increase flexion from the beginning of labor to its end. Every effort should be made to preserve the integrity of the membranes until after full dilatation has occurred; because if even slight extension occurs at the brim, its existence will prevent the engagement of the head until after the rupture of the membranes; and if this be prevented until the condition of the os renders access to the forehead easy, there is usually no difficulty in at once flexing the still free head.

If the position is diagnosticated by either abdominal or vaginal examination before engagement takes place, it is frequently possible to avoid the dangers of a posterior position by a preliminary rotation of the head, which can usually be accomplished by postural treatment. The patient should be placed in the knee-chest position; the head then tends to leave the brim under the influence of gravity; and as the presence of the spinal column makes the dorsal half of the child the heavier, the force of gravity promotes rotation of the fœtus as a whole, about its long axis, into an anterior position.

This treatment, when properly carried out and persisted in for a sufficient length of time, in appropriate cases, rarely fails: but it is essential that the position assumed should be the true genu-pectoral. The buttocks should be directly above the knees, and the chest should be in actual contact with the bed (Fig. 54, *a*), since this posture, though less comfortable to the patient, is far more likely to accomplish the desired end than are either of the modifications which the patient instinctively tends to assume (Fig. 54, *b* and *c*). The patient should be encouraged to retain this position as long as her strength permits, or until vaginal examination without alteration of her attitude demonstrates the fact that rotation has occurred. She should then be placed in the latero-prone position, upon the side opposite to that to which the occiput is directed (that is, in O. D. P. positions, upon the left side); and this attitude should be retained until engagement in the new position has been firmly established. In feeble patients, or if for any reason the knee-chest position is impossible or undesirable, the same effect may possibly be attained, though with less certainty, by a primary assumption of the latero-prone position: she should then, however, lie upon the side to which the occiput is directed. Should the head, after once becoming anterior, show any tendency to revert to the posterior position, it may even be wise to rupture the membranes in order to hasten the engagement of the head while still anterior.

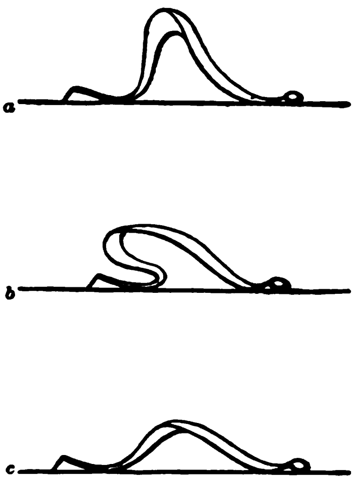

FIG. 54.—CORRECT (*a*) AND INCORRECT (*b* and *c*) METHODS OF ASSUMING THE GENU-PECTORAL POSITION.

If postural treatment fails or is not adopted, the case should be left to nature until rupture of the membranes occurs. Even after their rupture, no treatment is necessary while good flexion is present; but the mechanism should be carefully watched, by frequent vaginal examinations, in order to be ready to offer an early opposition to the occurrence of extension.

As soon as it becomes evident to the accoucheur that full extension has occurred, the chances of the passage of the superior strait without the assistance of art is so small that it is wise, after a single hour has passed without alteration of this condition, to etherize the patient, introduce the hand into the vagina, and dilate the os manually to a degree sufficient to permit flexion of the head, by pressure of the palmar surface of the half-hand against the forehead; which is the more easily reached from the fact that its position in the anterior and shorter segment of the pelvis places it within easy access from the vulva. When flexion has been secured, the ether should be removed, two fingers should be retained in position against the forehead, and, by pressure upon it, should oppose its descent during each succeeding pain; since arrest of the forehead with continued descent of the occiput necessarily implies the maintenance of flexion, and thus renders descent and rotation possible. If the membranes persist until the os is fully dilated, flexion may usually be produced or maintained by simple pressure upon the forehead with the fingers, which should be persisted in for from one to two hours before any attempt is made to reduce extension by the introduction of the whole hand.

If, after the establishment of flexion by manual pressure, re-extension occurs in spite of the efforts of the fingers to prevent it, or if, when good flexion is present from the start, the head is delayed at the brim until the usual indications for operation arise, it is better to abandon the expectant policy, and resort at once to operative interference.

OPERATIVE TREATMENT OF HIGH ARREST OF THE POSTERIOR OCCIPUT.

Three methods are possible: The child may be at once turned; the hand may be introduced, the head rotated to the front, and forceps applied; or the forceps may be used while the occiput is still posterior. The latter method is allowable only when the more favorable methods are for one reason or another contra-indicated or impossible, and the choice ordinarily rests between the procedures of manual rotation of the occiput to the front with a subsequent application of the forceps, and version.

Manual rotation and the application of forceps possesses two disadvantages—that the head not infrequently returns to its original position during the manipulations incident to the application of the blades, and that it necessarily involves the adjustment of the forceps to the head when freely movable above the brim—an operation which is by no means devoid of difficulty. It is also not infrequently attended by the displacement of one arm across the posterior surface of the neck; an accident which, if extraction by the forceps is given up and turning resorted to, is likely to result in an extremely obstinate arrest of the head and arm at the superior strait. Although expert operators often prefer the use of forceps after manual dilatation; operators of less skill will, for these reasons, probably succeed better by a primary resort to the operation of version, unless the condition of the uterus distinctly contra-indicates it.

Should manual rotation be decided upon, the hand which has the same name as the position should be passed into the vagina until its whole palmar surface can be applied to the forehead of the child, and the other hand should make counter-pressure upon the fundus externally. The forehead should be pressed upward until complete flexion has been secured, and the whole head lifted from the brim. The internal hand should then be rotated within the vagina, without alteration of its grasp upon the head, until the occiput is in the desired position, the external hand or those of an assistant meanwhile endeavoring to secure rotation of the body by external manipulations. After rotation has been effected, an assistant should seek to maintain the position by external pressure upon the head until the forceps have been applied.

If version is absolutely contra-indicated and manual rotation fails, an attempt should be made to bring the head through the superior strait by the application of forceps without alteration of the position.

HIGH FORCEPS IN POSTERIOR POSITIONS.—When version is contra-indicated and it becomes necessary to apply forceps to the head while the occiput is still posterior, the application of the blades to the sides of the head is inadvisable. The position of the parietal bosses and their close application to the sides of the pelvis, when contrasted with the greater space opposite the bi-temporal diameter, makes it extremely difficult to adjust the forceps to the ends of the bi-parietal diameter; and even when they are so adjusted a very slight forward inclination of the line of traction may cause them to slip forward along the head to the temporal regions; and if in any way they gain this position the sole and necessary result of traction upon the handles must be the production of extension, which of course results in arrest, or at least requires the use of increased and unnecessary force. Of course if the forceps are applied to the sides of the pelvis their compressive force tends to prevent rotation of the head; but since this cannot be expected to occur until after the passage of the brim, the objection loses its force. So soon as the head has passed the brim, the forceps must be removed, and readjusted for the low operation.

MANAGEMENT OF THE PASSAGE OF THE EXCAVATION.—When the head in posterior positions of the occiput has passed the superior strait, the ease and rapidity of its passage through the remainder of the pelvis is mainly dependent on the existence of good flexion, and the occurrence of its usual result, a prompt rotation. The treatment of this portion of the labor is therefore composed, firstly, of efforts to maintain flexion, or to restore it when it has been lost; and secondly, of the expedients which may be employed to favor or produce rotation during the extraction of the head whenever from any cause a well-flexed head is arrested in a posterior position.

MAINTENANCE OF FLEXION.—Since extension is especially likely to occur after the entrance of the head into the excavation, and because the delivery of even the well-flexed head is necessarily a somewhat longer process in posterior positions than when the occiput is anterior from the start, the efforts of the obstetrician to prevent the occurrence of extension should be redoubled with the passage of the head through the superior strait. From the moment when the head enters the excavation the fingers should be held constantly against the frontal bones, as far away from the large fontanelle as the pelvic space permits; and the descent of the sinciput should be prevented until the occurrence of rotation carries it beyond the reach of the fingers. If this precaution is carefully observed from the start, loss of flexion is extremely rare, and recourse to the more heroic methods required for its re-establishment may usually be avoided.

RE-ESTABLISHMENT OF FLEXION.—When extension occurs it must be reduced before any further progress is possible. For this purpose five methods are recognized; the forehead may sometimes be raised by simple pressure applied to it by the fingers. If the adaptation is easy, the occiput may be drawn down by the half-hand applied above or around it, per vaginam. If this plan fails, the last two methods may be combined—the vectis may be used, or the forceps may be applied to the occipital end of the head with their pelvic curve reversed.

If efforts to re-establish flexion by the use of the hand fail, the accoucheur is reduced to a choice between the vectis and the operation of reversed forceps, which latter expedient should be unhesitatingly adopted.

The Vectis.—The vectis (Fig. 55) was the precursor of the forceps. It was originally used for the extraction of the head by the application of leverage motions to one or the other side, or to both in alternation. It is to-day never used except for the reduction of extension, and, even when employed for this purpose, labors under two annoying disadvantages; first, its grasp of the head is dependent upon its possession of an exaggerated cephalic curve which renders its introduction very difficult; and secondly, it subjects both the maternal and fœtal tissues to no light risks of laceration, from the fact that its slipping can rarely be avoided without the application of an injurious amount of pressure. When it is used, the mother's tissues must always be protected by the insertion of two fingers between its convexity and the pelvic wall.

Reversed Forceps.—When the head is extended across the perineum in a posterior position, and has resisted the various methods of manual flexion, resort should be had to the operation of reversed forceps, which is in effect a mere extension of the ancient principle that the tips of the forceps should always be directed toward the leading point. The grasp which the forceps takes upon the extended head when applied with the pelvic curve reversed is, however, directed so far toward its occipital end that the instrument is almost certain to slip after flexion has been produced; and it should therefore be an invariable rule that so soon as this has been effected the forceps should be removed and reapplied.

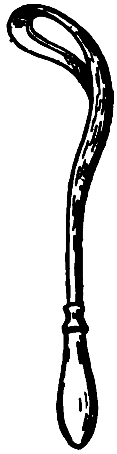

Fig. 55.—The Vectis.

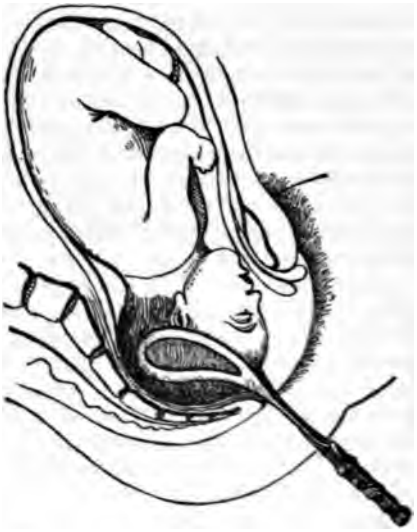

Fig. 56.—Reversed Forceps.

Technique.—The forceps should be placed outside the vulva in the position in which they are to lie when applied to the head; that is, with the transverse axis of the blades at right angles to the sagittal suture, and with the tips directed backward. If the lock is of the ordinary form, the handle of that blade which would be the left in the ordinary position should be held in the right hand, and, under the guidance of two fingers of the left, should be inserted into the vagina and passed into position as near as possible to the occipital end of the head (Fig. 56). The other blade should be adjusted to correspond with its fellow, and simple traction upon the handles should be made in the direction shown in the figure, all leverage motions being avoided. The force of the instrument is then directed against the occipital end of the head alone; the sinciput is delayed by the friction of the pelvic walls, while the occiput descends under the force of traction, and flexion results.

The operation of reversed forceps is easy and safe, but the position of the blades which is necessary for the production of extension renders them likely to slip if traction is persisted in after flexion has been secured. The tractions should therefore be gentle and made with one hand, the movements of the head should be carefully watched by the fingers of the other hand, and the forceps should be removed so soon as the small fontanelle is in the centre of the pelvis, *i.e.*, when the head has been flexed. The ether should then be removed, and the process of rotation intrusted to nature, since lacerations of the vagina are far less often produced when rotation is effected by the uterine forces than when it is procured by instrumental means. If, however, the condition of the patient necessitates an immediate delivery the forceps should be applied in the manner appropriate to the well-flexed head in posterior positions, and the child extracted with them.

PRODUCTION OF ROTATION.—When rotation fails in spite of the presence of good flexion, *i.e.*, when a well-flexed head is delayed in a posterior position until the signs of exhaustion occur, this failure is usually the result of a relative want of *vis à tergo*, which must be compensated for by the substitution for it of the *vis à fronte* of the forceps, but it is the first essential to success in this operation that the instrument should be so applied that its presence in the vagina offers no impediment to the rotation of the head.

TECHNIQUE OF THE APPLICATION OF LOW FORCEPS TO THE WELL-FLEXED HEAD IN POSTERIOR POSITIONS.—So long as the occiput is distinctly posterior to the transverse diameter of the pelvis, it is important that the forceps should be applied exactly to the sides of the head, and with the tips anterior. The tips should be anterior on account of the impossibility of securing a secure grasp with the reversed forceps. The blades should be applied with accuracy to the sides of the head, since in any other possible position their compressive force would be directly opposed to the occurrence of rotation, which is the immediate object of the operation. They should of course be applied as near to the occipital end of the head as is convenient; and during the application the handles should be well elevated, so that the tips may be well posterior when it is concluded.

The first tractions should be directed as far backward as the perineum will allow; and since the pelvic curve of the instrument makes it difficult to secure this line of traction in posterior positions by the ordinary methods of traction, it is not infrequently well to employ the force of one hand upon the shanks of the instrument in the immediate neighborhood of the vulva, while the other steadies the extreme end of the handles (Fig. 57). During the extraction it must be remembered that, owing to the angle which the handles of the curved forceps make with the axis of the vagina, rotation must necessarily be attended by a lateral motion upon their part (Fig. 58), and though no positive rotatory

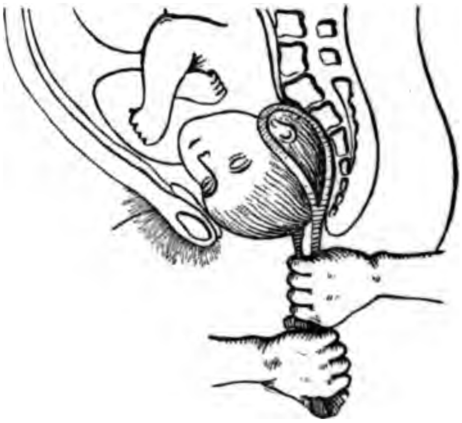

FIG. 57.—METHOD OF MAKING TRACTION IN POSTERIOR POSITIONS.

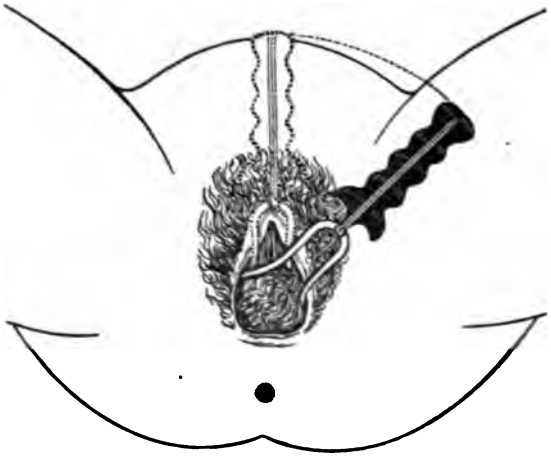

FIG. 58.—MOTION OF THE HANDLES OF THE CURVED FORCEPS DURING ROTATION OF THE HEAD.

force can safely be employed, the operator should be careful to grasp the handles so lightly as to oppose no resistance to the occurrence of rotation under the thrust of the pelvic planes. If a good pair of straight forceps can be procured, it is much the better instrument for low operations in posterior positions, since with them no such lateral motion occurs, and the avoidance of the necessity of watching for it greatly simplifies the operation.

When rotation has carried the occiput to a position in which the line of the sagittal suture coincides with the transverse diameter of the pelvis, the forceps should be removed and reapplied as closely as possible to the sides of the head, but with their tips directed towards the occiput. If the adaptation between the head and pelvis is anything but extremely easy, it is rarely possible to secure at this time anything better than an approximately correct application; but in this position (Fig. 59) the compressive force of the blades is a powerful agent in promoting rotation.

The tractions should be intermittent, rotation of the forceps with the head should be favored, and the compression should cease during the intervals between the contractions, in order to permit the head to rotate within the blades. When the head has become distinctly anterior, the forceps should be removed and reapplied to the sides of the head, unless it has so rotated within them that the application is already satisfactory.

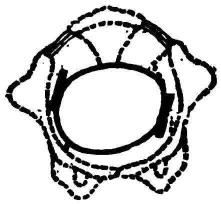

FIG. 59.—DIAGRAM ILLUSTRATING THE EFFECT OF THE COMPRESSIVE FORCE OF THE FORCEPS IN PROMOTING ROTATION.

LOW FORCEPS TO THE PERSISTENT OCCIPUT POSTERIOR.—In the rare cases in which the occiput is so exactly posterior as to miss the thrust of the sacrum and settle into the gutter formed by the lateral portions of the pelvic walls and soft parts, it may occasionally happen that all efforts at the promotion of natural or manual rotation fail. The production of rotation by instrumental means through an arc of 180° is, moreover, attended by so much danger from laceration of the vagina as to be seldom wise. Should it be necessary to resort to instrumental delivery in such a case, the forceps should be applied to the sides of the head with the tips anterior, and the extraction should be conducted in imitation of the normal mechanism of delivery, face to pubes, *i.e.*, by the so-called pump-handle traction; the line of traction should be directed backward until the perineum is fully distended by the head. Without intermission of the traction, its direction should then be gradually swept upward until the small fontanelle appears at the fourchette, and the perineum retracts over the sub-occipital region; it should then be swept downward toward the floor, again without intermission of its force, until the chin appears under the arch.

CHAPTER XVI.

ABNORMAL PRESENTATIONS.

BROW, FACE, BREECH, AND TRANSVERSE PRESENTATIONS. PROLAPSED EXTREMITIES.

Brow Presentations.

MECHANISM.—The child presents by the brow when the bridge of the nose or the supra-orbital ridges can be felt on one side of the pelvis and the anterior fontanelle on the other, while the frontal suture occupies the centre of the field.

This presentation usually offers an efficient obstacle to delivery; but in long-neglected cases, if the contractions are powerful and the head is very small, its shape may be so altered by moulding as to permit its delivery without change of presentation. This, however, cannot occur until the shape of the head is so altered by the pressure of the pelvic walls that the prominence of the occiput is almost completely effaced, and the convexity of

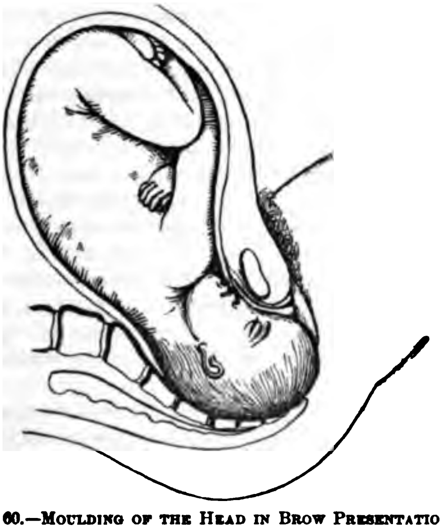

FIG. 60.—MOULDING OF THE HEAD IN BROW PRESENTATIONS.

the forehead is increased to such a degree that it is capable of assuming the rôle played by the occiput in vertex cases as the leading point in the production of rotation (Fig. 60). When such a change has occurred, the projecting brow receives the rotating impulse of the pelvic floor and turns to the arch. The nose and upper jaw become fixed against the descending rami, the occiput sweeps over the perineum in excessive flexion, and the face is borne by extension. Such extreme moulding is rarely possible until after the death of the child, and is almost never seen at term. In the rare cases in which it does occur, the sinciput is almost invariably anterior from the start, the unchanged delivery of a posterior brow being so extremely rare that it may be left out of account.

PROGNOSIS.—The prognosis for the child in neglected brow cases is almost necessarily fatal, but is much improved by early interference, when it becomes that of the operation which is proposed. The mother's life is endangered only by the exhaustion which follows long neglect. Her soft parts are always likely to be torn, not only from the inherent risks of early operative interference, but because in prolonged cases the altered shape of the head subjects them to an increased strain during extraction by forceps or after version.

MANAGEMENT OF BROW PRESENTATIONS.—The treatment which should be adopted in a given case depends upon the degree of moulding which the head has already undergone, and upon the position of the sinciput.

Much-Moulded Brows.—If a marked change of shape is apparent at the time when the presentation is detected, version is usually the preferable operation, for the reasons—1st, that the configuration of the cranium is much more nearly that which is proper to the after-coming than to the fore-coming head, and that version is therefore safer for the child; 2d, that its restoration to the position of flexion necessary to the delivery of the vertex is likely to result only in its re-extension into a brow, under the force of the forceps.

If version is contra-indicated, if the moulding of the head is such that forceps is impossible, and the sinciput is anterior, the head should be completely extended by traction with the fingers upon the upper jaw and chin, and the presentation thus converted into a face, when it may be left to nature or subjected to forceps, according to the judgment of the accoucheur. If under similar conditions the brow is posterior, its extension into a face is unjustifiable on account of the almost certain death of the child in high applications of forceps to the posterior face; and the only operation then indicated is that of craniotomy.

If a much-moulded head presents by the brow, sinciput anterior, and is so far engaged that version or extension into a face are both impossible, forceps may be applied, and the delivery of the brow, as such, attempted. The blades should be applied to the sides of the head, with the concavity of the pelvic curve directed anteriorly, and the mechanism of the natural delivery of a persistent brow should be imitated; but the chance of extracting a living child in this way is so extremely small, and the danger to the soft parts of the mother is so great, that the application is never permissible while any other conservative operation is possible, and then not unless the child is in thoroughly good condition. Such cases are almost never seen during the life of the child, and perhaps never at term.

Unmoulded Brows.—If the shape of the head is not appreciably altered at the time when treatment is instituted, the choice of operation depends mainly on the position of the occiput. When the forehead is posterior, manual flexion results in the production of an anterior position of the vertex, which may then usually, in the absence of pathological conditions (*i.e.*, contracted pelvis, intra-uterine tumors, etc.), be extracted with ease by forceps. After the re-establishment of flexion the head should be held in position by the hand during a few pains; but unless it engages promptly in a well-flexed position, it is usually best to resort at once to forceps, since it may fairly be presumed that the causes which were primarily sufficient to produce extension are likely to reproduce it if the case is left to nature.

In anterior positions of the brow, flexion of the head results in the production of a posterior position of the occiput; from which it follows, on the general principle of the treatment of posterior positions at the brim, that anterior positions of the brow must either be treated by primary version or be subjected to manual rotation, in addition to flexion, before the application of forceps; and in cases in which any moulding of the head is apparent the dangers and difficulties of the latter operation are so considerable that it is usually best to make version the operation of choice.

Should version be contra-indicated, resort should be had to manual rotation and the use of forceps.

In freeing a partially engaged brow from the brim of the pelvis as a preliminary to version, it is essential that the first effort should be directed against the forehead, since preliminary flexion and subsequent elevation expose the tissues of the mother to far less risk than an attempt to force the extended occipito-frontal diameter bodily upward. Flexion is, moreover, an important element of success in the subsequent manipulations, since its production minimizes the obstacle afforded by the projecting brow.

Face Presentations.

MECHANISM.—In presentations of the face, the chin plays the same rôle in rotation which is held by the occiput in normal labor; and the existence of complete extension is as necessary to the mechanism of face presentations as is the existence of good flexion in presentations on the vertex.

In anterior positions, even if the head is well extended and the adaptation is such that descent goes on readily, some obliquity usually persists until the chin is actually in sight at the vulva. Rotation then always occurs, the face appears at the vulva, and sweeps forward to permit the occiput to be borne by extension.

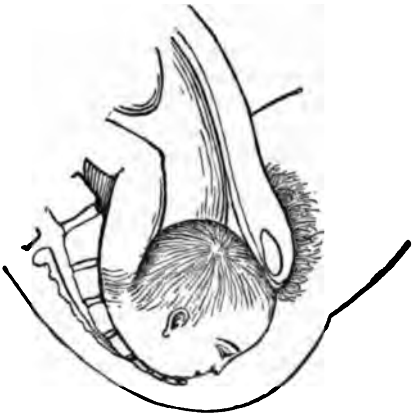

FIG. 61.—MECHANISM OF POSTERIOR POSITIONS OF THE FACE.

In posterior positions, extreme extension must be present in order to permit the chin to receive the thrust of the pelvic floor. This can rarely happen except after extremely long labor and excessive alteration of the shape of the head (Fig. 61); it may then exceptionally occur, but in the majority of cases the chin remains persistently posterior, and can be delivered only by the interposition of art.

PROGNOSIS.—The prognosis for both mother and child is always worse than in normal labor, but differs greatly with the position of the chin. In rapid face labor, with uncomplicated anterior positions of the child, it is unaltered for the mother, and is but little worse for the child than in normal labor. In posterior positions the prognosis for the mother involves a very considerable risk of exhaustion from delay under the most favorable circumstances, and the child is exposed to the utmost danger both from the necessary compression of the cranium against the symphysis and from the great tension upon the tissues of the neck, which is implied in the extreme extension which is necessary to permit rotation at the time when the chin impinges on the pelvic floor (Fig. 61). In a large majority of cases, moreover, rotation fails; and the extraction of a living child is then extremely unlikely, even by the aid of forceps and after incision of the perineum.

MANAGEMENT OF FACE PRESENTATIONS—CHIN ANTERIOR, HIGH.—When the chin is anterior and progress is satisfactory, the duty of the obstetrician is limited to the maintenance of extension by pressure upon the under surface of the lower jaw. If arrest occurs high, such cases are best suited to primary version, since flexion of the head could only result in the production of a posterior position of the occiput after flexion; but if the condition of the uterus renders version difficult or impossible, the head may be flexed and rotated to an anterior position, and forceps applied.

In case the face is deeply engaged, or other circumstances render its flexion difficult, it may be delivered as a face by forceps; great care must, however, be exercised to direct the tips of the blades well backward toward the occiput, in order to avoid the production of dangerous, or even fatal, compression of the great vessels of the neck.

CHIN ANTERIOR, LOW.—When the anterior chin is arrested low, the application of forceps to the sides of the head is usually easy, and is not particularly dangerous to either mother or child, if unduly rapid extraction be forbidden and if compression of the neck by the tips of the instruments is carefully avoided.

CHIN POSTERIOR, HIGH.—By far the preferable operation is the conversion of the posterior chin into an anterior occiput by manual flexion, when the case may be left to nature or the child extracted by forceps, in accordance with the general indications. If re-extension occurs, or efforts at manual flexion fail, the operation of version should be chosen, unless this is contra-indicated by a retracted condition of the uterus, in which case but one conservative operation is possible—the hand should be passed upward to seize the forehead, and an attempt made to rotate the face manually into a mento-anterior position, when forceps should be applied. This operation is, however, so dangerous to both mother and child that craniotomy should be preferred unless the operator is confident of his own skill and the condition of the child is thoroughly good.

CHIN POSTERIOR, LOW.—If the face is already in the excavation with the chin posterior, and rotation fails to take place, or indications for an immediate delivery arise, the prospects for delivery without craniotomy are extremely poor. If the child is in good condition, and the adaptation is not excessively tight, forceps should be applied to the sides of the head, and cautious attempts made to secure rotation by gentle rotatory movements of the handles during traction. Should this fail, extraction of the child with the chin persistently posterior with forceps, by pump-handle tractions,[1] should be given a trial, the tension of the pelvic floor being relieved by deep lateral incisions through the perineum; but since the extraction of a living child by this method has not as yet been reported, and the soft parts of the mother are certain to be extensively lacerated, craniotomy should be preferred unless the condition of the child is thoroughly good.

Breech Presentations.

MECHANISM. — Under normal circumstances the child is driven through the pelvis under the influence of the uterine forces, with the flexed lower limbs folded against the abdomen and the arms across the chest. The anterior hip rotates to the arch, the posterior settling into the curve of the sacrum. The body bends laterally upon itself (Fig. 62), the hips appear at the vulva and the trunk follows, the head being flexed and the arms held down across the chest by the pressure of the intra-uterine force from above. The arms emerge with the body, the head enters the pelvis in a state of flexion, the sinciput settles into the gutter of the pelvic floor, the face appears at the vulva, and the head is borne in a state of flexion.

ABNORMAL MECHANISM OF BREECH PRESENTATIONS.—The abdomen of the child may exceptionally rotate to the front in natural breech deliveries, but this accident is more frequently observed after an improperly conducted rapid extraction. In such cases the chin almost necessarily catches upon the symphysis pubis, extension occurs, and the occiput impinges upon the posterior part of the pelvic brim. Delivery is then only possible by the production of complete extension. The body of the child should be swept upward over the mother's abdomen, and strong traction applied to the feet when in that position, while the other hand is introduced into the vagina and made to free the posterior portion of the head by forward pressure upon the back of the neck. After the relief of the impaction, the head readily passes the pelvis, the occiput appears at the vulva, and is followed by the forehead and face (Fig. 68). In the rare cases in which the head enters the pelvis well flexed and with the face anterior, the body must be dropped toward the floor, when the face appears at the vulva, and the head is borne in flexion.

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[1] See low forceps to persistent posterior positions, page

Prognosis.—In breech presentations the prognosis for the mother is worse than in normal labor only in so far as the frequent necessity for a rapid extraction of the child exposes her to additional risks of cervical or perineal lacerations. The prognosis for the child is distinctly less favorable, since a considerable proportion of breech children are lost under the best care, but the exact percentage varies so much with the skill of the attendant as to be hardly worth stating.

Breech cases are divided into presentations of the whole breech, and of one or both feet. The prognosis of footling presentations for the mother is precisely that of the whole breech, but is somewhat worse for the child, on account of the greater liability to compression of the cord, presentations of both feet being correspondingly more serious than those of one.

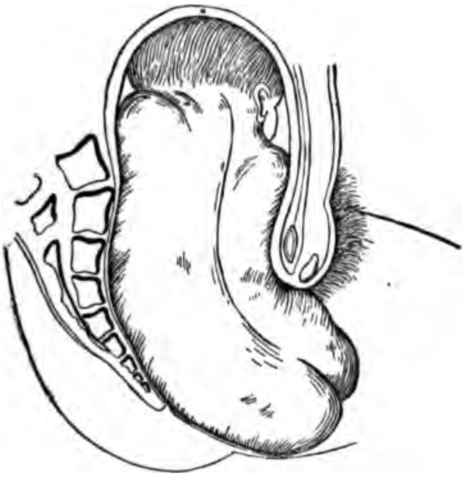

Fig. 62.—Lateral Flexion of the Trunk During the Expulsion of the Breech.

Management of Breech Presentations—Natural Breech Labor.—In normal breech labor the attendant's duty is to relieve the perineum from undue strain by elevation of the hips so soon as they appear; to reduce the bulk of the presenting part by extracting the legs so soon as the feet appear; to draw down and free a loop of the cord as soon as the umbilicus is within reach, in order to remove the danger of undue tension upon the cord during the remainder of the delivery of the child; and to sweep the body forward over the mother's abdomen in the curve of Carus as soon as it is delivered, that the rotation and expulsion of the head may not be interfered with by its weight; no efforts of traction are normally necessary. He should especially avoid the exertion of any traction upon the presenting part so long as the progress of the case is satisfactory, since, if such traction is made, the friction of the arms and face against the pelvic floor is likely to be greater than the pressure of the uterine forces from above, and to result in the extension of the arms and their entrance into the pelvis at the sides of the extended head, when further progress is impossible without operative release of the arms, and the child is subjected to a risk of delay which materially lessens its chance of survival.

One other and extremely important duty remains; from the time that the breech engages in the pelvis until the cord is within reach of the finger, the obstetrician should maintain an unintermittent watch upon the fœtal heart, in order to detect the earliest indication of an alteration of the circulation of the child by compression of the cord against the pelvic walls. If any persistent alteration of its rhythm is noted, the conservative policy hitherto adopted should be instantly abandoned, and rapid delivery resorted to, since if the cord has been once subjected to pressure its circulation is almost certain to be totally arrested during the further progress of the case; and if interference is likely to be necessary at all, it is far better that it should be undertaken while the child's vitality is still unimpaired.

RAPID EXTRACTION OF THE BREECH—HIGH ARREST.—When the breech is arrested at the superior strait until the signs of exhaustion of one or the other patient appear, or when rapid delivery becomes necessary by reason of some pathological condition which threatens the lives of mother or child, five methods of securing descent are applicable. Traction may be made upon the groin with the finger, the fillet, or blunt hook, forceps may be applied to the breech, or the hand may be inserted into the uterus and made to bring down a leg, for use as a handle with which to make traction.

Use of the Finger.—If the finger reaches the groin with sufficient ease to make traction effective, this procedure is always preferable to all others; but it is unfortunately seldom possible in high interference, unless where some pressing danger necessitates the immediate delivery of a distinctly small breech.

The Blunt Hook.—Both the fillet and blunt hook can usually be applied to the groin without especial difficulty in any portion of the pelvis, and both are fairly effective means of traction; both, however, labor under the disadvantage of subjecting the tissues of the child to great risk of injury; the blunt hook, when skilfully used, being perhaps the less dangerous. The blunt hook should be passed up under the guidance of the finger, between the anterior hip of the child and the horizontal ramus of the pubes, until it can be so rotated that its point passes between the child's thigh and abdomen. The finger should then be passed between the thighs and brought into contact with the point of the hook, which should then be settled downward by slight traction until it fits snugly against the hip joint, and the fingers should be kept in contact with the tip throughout the extraction, in order to guard the soft parts from injury so far as possible. The line of traction should be directed slightly toward that side of the mother on which the sacrum of the child lies (Fig. 63), since traction in any other direction is extremely likely to result in fracture of the femur; an accident which is especially frequent in sacro-posterior positions.

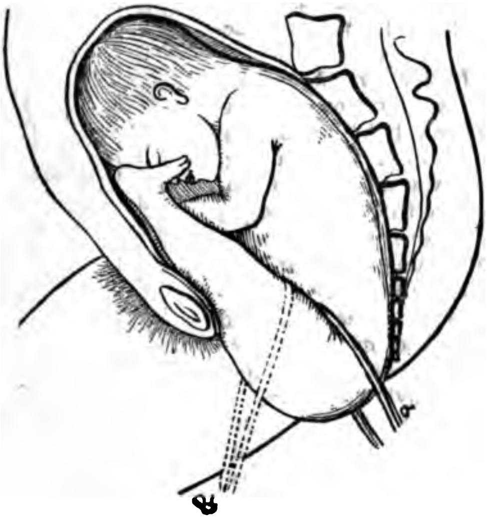

FIG. 63.—PROPER AND IMPROPER DIRECTION OF TRACTION UPON THE THIGH. *a* Proper direction; *b*, improper direction.

The Fillet.—The fillet may be made of a piece of broad tape (preferably linen, on account of its greater strength), or of a wide strip torn from a silk handkerchief. The best fillet known is, however, that made by passing a stout cord through a piece of rubber tubing about three-eighths of an inch in diameter. The fillet may occasionally be passed through the groin by the unaided fingers, but in all except the most simple cases its adjustment in this manner is impossible.

Several ingenious porte-fillets have been devised, but their place is equally well filled by a very simple device which can be readily improvised at the time of operation. A large English webbing catheter is threaded with a double loop of strong but narrow bobbin, and its stylet is bent to the shape of the blunt hook (Fig. 64). The catheter is passed into the groin, the finger draws down the projecting loop of string until the end of the fillet can be knotted within it, and, by traction on the string, it is drawn close to the tip of the catheter. The instrument is then removed by a reversal of the process by which it was introduced, when the fillet settles into position in the groin. The use of the fillet is as liable to result in fracture of the thigh as is that of the blunt hook, and the same precaution must be observed as to the direction of traction.

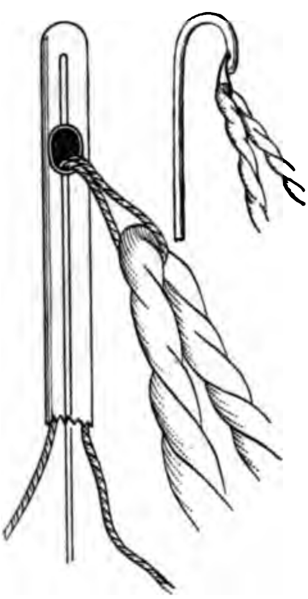

FIG. 64.—USE OF THE CATHETER AS A PORTE-FILLET.

Forceps to the Breech. —Until within the last few years it was commonly stated that the presentation of any part of the fœtus except the head was an absolute contra-indication to the use of forceps; but it is now known that if this instrument is accurately adjusted to the breech its use is rarely productive of any injury to the child, and it is perhaps the most effective means at our disposal for the rapid delivery of the pelvic extremity. If the position of the breech is distinctly oblique the tip of one blade should lie against the upper sacral vertebræ, while that of its fellow should be pressed into the flexor surface of the most easily accessible thigh. If the position of the hips is transverse, each tip should impinge upon a femur just beyond or above the great trochanter, which then furnishes a firm hold for the blades.

Application of the Forceps.—The forceps should be placed in an approximately correct position upon the breech: the hand should then be passed into the vagina until the finger-tips can touch the exact spots at which the tips of the blades should lie; when an accurate adjustment is easily attained by direct movement of the tips of the blades with the internal fingers. The small size of the tapering breech, in comparison with the diameters of any pelvis through which a living child can be extracted, renders this manœuvre extremely easy. When the forceps are once in position, the handles should be brought together sufficiently tightly to ensure a firm compression, which should then be maintained without intermission until the delivery of the child. The ordinary forceps are better adapted to this application than any special forms which have been devised; but the advantages of axis-traction are perhaps more fully apparent in high arrest of the breech than in any other obstetric operation.

Extraction of a Leg.—The introduction of the hand to bring down a leg requires no special description, other than that all the precautions proper to a version should be observed, and that the operator should be careful to ascertain the position of the cord and thus avoid the production of an unnecessary prolapse.

The leg when extracted should be wrapped in an aseptic towel and traction made upon it in a line which should at first be directed as far backward as the perineum allows, in order to draw as nearly as possible in the axis of the superior strait; but, as the breech descends, the line of traction swings forward until as the hips clear the vulva it becomes nearly vertical.

As soon as the knee is well outside of the vulva the grasp of the hand should be shifted to the thigh, as traction on the lower leg is apt to overstrain the ligaments of the knee-joint.

If there is any difficulty in bringing the breech to the vulva, its delivery may be assisted by hooking a forefinger into the other groin as soon as it is within reach, and, as it distends the perineum, it should be drawn well forward and every effort made to prevent a laceration, precisely as is done in the delivery of the fore-coming head.

When the second knee appears at the vulva, it should be drawn along the side of the child and toward its back until the foot can be released by flexion of the leg upon the thigh; but during this process traction upon the shaft of the femur must be avoided, as it is always likely to cause fracture. Care should also be taken to bend the knee only in the natural direction.

After the entrance of the breech into the excavation, the use of the finger is often readily possible, and the use of the fillet and blunt hook becomes easier and somewhat less dangerous, as is also the case with the forceps; manual extraction of the leg is usually then impossible.

Choice of Methods.—In high arrest the use of the finger is seldom possible. The fillet and blunt hook are so likely to injure the child's groin that when the breech is high and movable and the uterus is in a relaxed condition, the choice should ordinarily rest between forceps and the extraction of a leg. The latter is then, upon the whole, the easier operation, and generally the more efficient, since, in addition to furnishing a convenient handle, the extraction of one leg greatly diminishes the size of the breech; but if the breech is firmly engaged and the uterus is so far retracted as to resist the introduction of the hand, the use of the forceps should be preferred. The only objection to its employment is the argument that it is likely to result in laceration or sloughing of the soft parts of the child—a statement which has been clearly refuted by the fact that in actual practice no such results have been seen. It rarely fails to deliver the breech in any case in which delivery is possible, unless both legs are fully extended across the abdomen and chest, in which case, as was originally pointed out by Barnes, the lower extremities act as a splint to the body, and prevent it from assuming the serpentine curve which is necessary to the delivery of the hips. In this condition the extraction of a foot is the only expedient which is likely to be successful.

In low arrest the preference should be given to the finger, and in the event of its failure the forceps should be applied.

Extraction of the Body.—When the hips have cleared the vulva, and the popliteal spaces appear, the legs should be extracted by hooking a finger into the hollow of each knee successively, and drawing them along the child's side toward its back, thus flexing the knee and bringing the foot to the vulva.

When both legs have been released, one thigh should be grasped by the fingers of each hand, while the thumbs lie along the sacrum (Fig. 65), the line of traction should again be directed as far backward as the perineum allows, and the back of the child should be rotated gently to the front during each of the remaining tractions.

A towel wrung out of a warm corrosive solution should still be wrapped around the breech, both to prevent slipping and because contact with the air is likely to induce premature respirations.

As soon as the umbilicus appears at the vulva, a finger should be passed into the vagina and the cord drawn gently downward until enough has been gained to prevent any further dragging upon the navel.

If the arms remain folded upon the chest it is an easy matter to hook a finger successively into each elbow and extract them; but if, as is usual, they become extended above the head by friction against the walls of the canal, their release becomes a more difficult matter. In easy extractions it is generally possible to bring the shoulders outside the vulva by simple traction upon the thighs; the body of the child is then dropped toward the floor and drawn as far backward as the perineum allows; and two fingers are then passed over one shoulder and along the upper surface of the arm to the bend of the elbow. The arm is pushed downward and backward across the face of the child by pressure in the bend of the elbow, and, as the elbow appears at the vulva, the fingers slide along the forearm to the hand and easily sweep it outside the vulva.

The other hand of the operator then repeats the same procedure with the other arm.

The child is then laid astride of one forearm, and the hand which belongs to it is passed into the vagina until its first and second fingers lie upon the canine fossæ of the child, while the other hand is hooked over the shoulders, with the neck between its first and second fingers, and their tips upon the supra-clavicular region. The assistant then presses the head downward by supra-pubic pressure in the axis of the superior strait, and both hands of the operator make simultaneous traction, as nearly as possible in the same direction, the internal hand at the same time exerting itself to preserve the necessary flexion of the head (Fig. 66). As the head emerges the line of traction sweeps forward in the curve of Carus, until at the end of the extraction the body of the

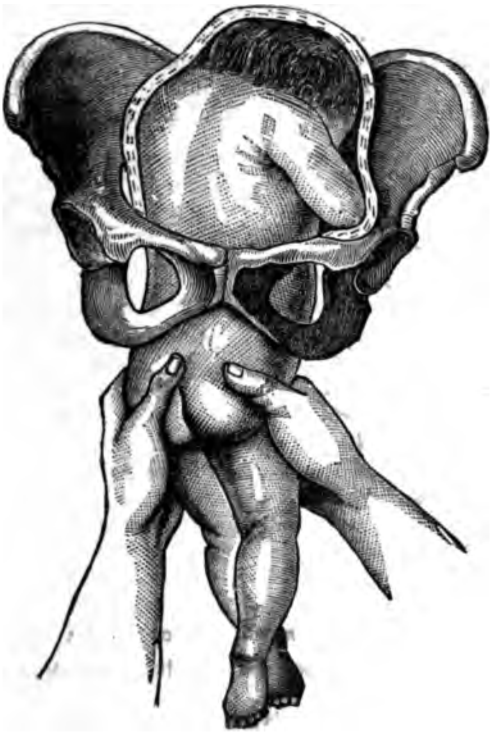

FIG. 65.—METHOD OF GRASPING THE PELVIS (LUSK).

child rests upon the other forearm and along the abdomen of the mother.

When the mouth appears at the vulva, all hurry ceases, and the operator's efforts should be directed to the preservation of the perineum. All traction should cease, the upper hand should promote flexion by restraining the descent of the occiput, and the other should be used to shell out the head by pressure on the forehead through the perineum, or, if necessary, by passing two fingers into the rectum.

This, which is known as the method of extraction by combined traction upon mouth and shoulders, may sometimes be replaced with advantage by the method known as Deventer's (because introduced by an obstetrician of that name about the year 1715).

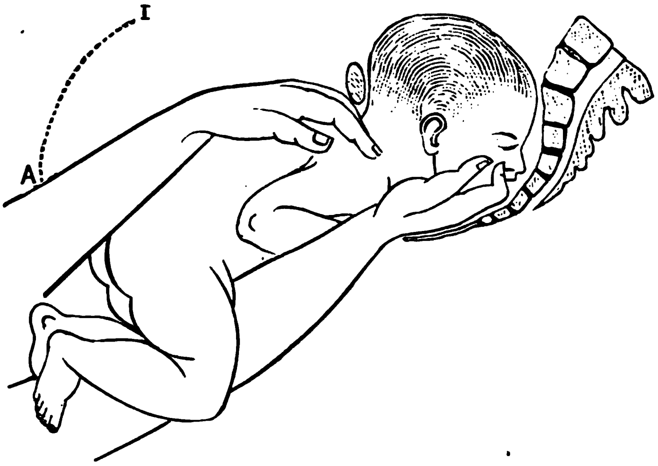

FIG. 66.—COMBINED TRACTION UPON FACE AND SHOULDERS.

This method was warmly advocated by Deventer, but fell into disuse and was practically forgotten, until within the last two years it has been revived and highly praised by several prominent American obstetricians. It is so simple and rapid a procedure that it is worthy of trial in any case in which the shoulders can be brought readily into view.

By this method the after-coming head and the extended arms are extracted together, by simple traction on the feet and shoulders. When the shoulders appear at the vulva the body of the child is swung sharply backward, the feet are grasped by one hand and the shoulders by the other, and both hands make traction simultaneously, and directly toward the floor (Fig. 67). By this manœuvre the arms, which lie by the side of the head, are pressed against the yielding and elastic sacro-sciatic ligaments, the chin is arrested by the pelvic floor, extension occurs, the occiput appears at the vulva, the head is born by extension, and the arms follow. The advocates of the method believe that it never tears the perineum, and my own rather limited experience with it certainly supports this somewhat astonishing claim.

The ease and rapidity with which delivery can sometimes be effected by this manœuvre is very surprising; but it is as yet a comparatively untried measure, and further experience may develop contra-indications to it. It is certainly inapplicable when the head and arms are arrested at the superior strait.

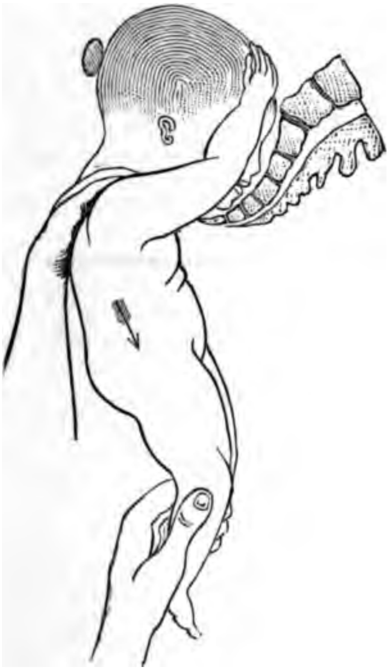

FIG. 67.—DEVENTER'S METHOD OF EXTRACTION.

After the delivery of the child the uterus should be watched by an assistant, and every precaution taken against post-partum hæmorrhage, which is peculiarly likely to follow a rapid emptying of the uterus under the profound surgical anæsthesia which is proper and necessary in the performance of version.

Unless the child has reached the stage of pale asphyxia and feeble heart, it is well to hold it suspended by the feet for some minutes after delivery before cutting the cord. This promotes the return of blood to the brain, permits the normal influx of blood from the placenta, tends to drain away inspired liquor amnii or mucus, and is in itself a valuable method of resuscitation. In case it is thought necessary to proceed at once to more active treatment, time can often be saved by breaking the funis near the vulva, and at such a distance from the child that its end can be readily compressed by the hand which holds the infant. A broken cord rarely bleeds, and can be tied at the proper distance after all hurry has ceased.

DIFFICULT EXTRACTION OF THE AFTER-COMING HEAD AND ARMS.—The difficulties met with in extraction are due to: (*a*) Arrest of the head and arms at the superior strait; (*b*) arrest of an arm behind the occiput; (*c*) closure of a constriction ring or of an imperfectly dilated os about the neck; or (*d*) to arrest of the head, by its excessive size, by extension, by a rigid perineum, or by contraction of the pelvis.

Arrest of the Arms at the Superior Strait.—When the child is large, or the transverse diameters of the pelvis are diminished, the wedge formed by the head and arms is often too large to pass the superior strait. In such a case the release of the arms must be effected before the head can enter the pelvis.

The extraction of the arms from the superior strait is a much more difficult matter than their release after they have entered the pelvis, and is effected by a different manœuvre. The arrest occurs at or about the time when the points of the scapulæ appear at the vulva, and before the back is wholly turned to the front. If such an arrest is felt, and unless it can be overcome by very moderate efforts, all traction should be stopped, and the thorax should be grasped by both hands, pushed slightly upward to relieve the impaction, and rotated, if necessary, until the antero-posterior diameter of the child is nearly, if not quite, transverse to the pelvis. The feet should then be seized by the hand which corresponds to the back of the child and drawn firmly upward and to that side, toward the groin of the mother. This answers the double purpose of drawing the posterior arm further into the pelvis and of making room for the passage of the operating hand into the vagina. The free hand is then rapidly passed along the abdomen of the child to the posterior shoulder, and one or two fingers are passed along the arm and hooked into the bend of the elbow, which is then drawn downward, and across the face, into the vagina. The hand is then swept out of the vulva by pressure upon the forearm, applied as near to the wrist as possible.

The feet are then drawn downward, and to the same side as before; the same hand is passed over the abdomen to the anterior shoulder, and an attempt is made to pass two fingers behind the symphysis to the bend of the elbow. If the elbow is reached, it is to be drawn downward across the face, as was the posterior arm; but unless this attempt is at once successful, the hand should be withdrawn, and the back of the child should be rotated across the front to the other side, so that the retained arm becomes posterior. This rotation may be effected either by grasping and turning the thorax with both hands, or by drawing the prolapsed arm forward between the labium and the back of the child.

The hand which before entered the vagina then draws the feet upward and to the side, while the other hand is passed over the abdomen to the elbow, and draws down the arm in the manner already described.

If the hand passed over the abdomen fails to find the posterior elbow, it may sometimes be reached by seizing the feet in that hand, drawing them strongly upward and to the other side, passing the hand which before held the feet along the back of the child to the posterior shoulder, and thence along the back of the arm to the elbow, which, as before, must then be pressed down across the child's face.

In rotating the child it must always be remembered that the articulations of the neck are so arranged that, if the point of the chin be carried behind the point of the shoulder, dislocation of the atlas upon the axis is the result. For this reason the thorax should be pushed strongly upward whenever an effort at rotation is made, in order to free the head from the superior strait; and the hands of the assistant should watch the head, that he may warn the operator if it fails to follow the shoulders.

Arrest of an Arm Behind the Occiput.—It sometimes happens that the head rotates with the shoulders, but the arm is detained behind the pubes by friction against the walls. In such a case the arm crosses the nape of the neck, and, if traction is made, becomes jammed between the occiput and the symphysis. If the accident is discovered before traction has been made, prompt rotation in the reverse direction may unlock the arm; and in this case this reversed rotation should be continued until the arm becomes posterior, *i.e.*, through 180°; but unless the first attempt unlocks the jam, the child will probably be lost, and it is then perhaps best to make direct traction upon the shoulders, in the hope of extracting the head and arm together, at the risk of fracturing the humerus, after forewarning the bystanders that this must be the result, and that it is done in the interests of the child.

Closure of a Constriction Ring, or of an Imperfectly Dilated Os, about the Neck.—The stricture of the canal formed by either of these conditions may embarrass the release of the arms, but does not otherwise affect the above-described manœuvre, except that any abrupt or too forcible movements of the hand while within the uterus are even more dangerous in these cases than in others; the extraction of the head from the constricting band is, however, often a matter of great difficulty.

Any attempt to overcome this obstruction by force exposes the mother to the most imminent danger of rupture of the uterus; and, though steady traction upon the mouth and shoulders should be given a fair trial and may effect dilatation in time to save the child, it is in these cases that the application of forceps to the after-coming head is most often indicated. There can be no doubt of the truth of Lusk's observation that "the forceps will sometimes bring the head rapidly through the cervix, when traction upon the feet only serves to drag the uterus to the vulva." Care should, however, be taken that this rapidity be not so great as in itself to cause serious laceration.

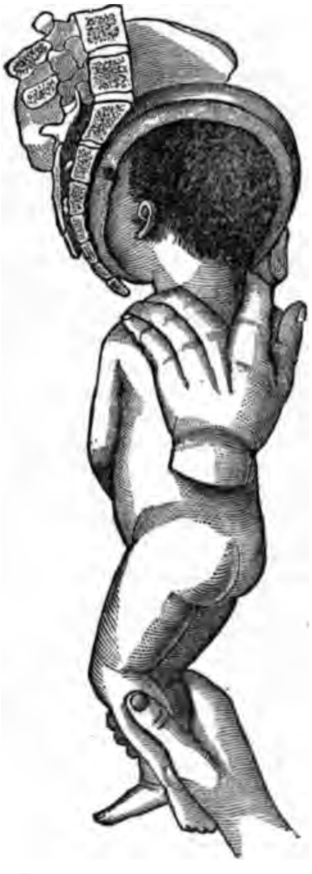

FIG. 68.—THE PRAGUE METHOD: FIRST STAGE (LUSK).

Arrest of the Head at the Superior Strait by Reason of Unusual Size of the Head.—Most German and American obstetricians believe that the use of combined traction upon the face and shoulders is the best method to adopt in arrest of the after-coming head, at any point in the pelvis, and it should certainly be the first method tried in any given case; but as cases frequently occur in which the head can be delivered with far greater ease by a rapid alternation between two or more methods than by the continued use of any one alone, it is, for this reason if for no other, well to be familiar with all the methods which have been found to be of value.

The Prague Method.—This manœuvre is often of service in effecting the engagement of the head and its initial descent into the superior strait. This is especially true in certain forms of contracted pelvis, and to operators whose muscular strength is inadequate to the really severe strain which is sometimes imposed upon the internal hand in the use of the combined method at the brim; but it is usually inferior to the combined method after the greatest diameter of the head has passed the superior strait. Like all methods of manual extraction, it is greatly increased in value by the application of proper supra-pubic pressure by an assistant.

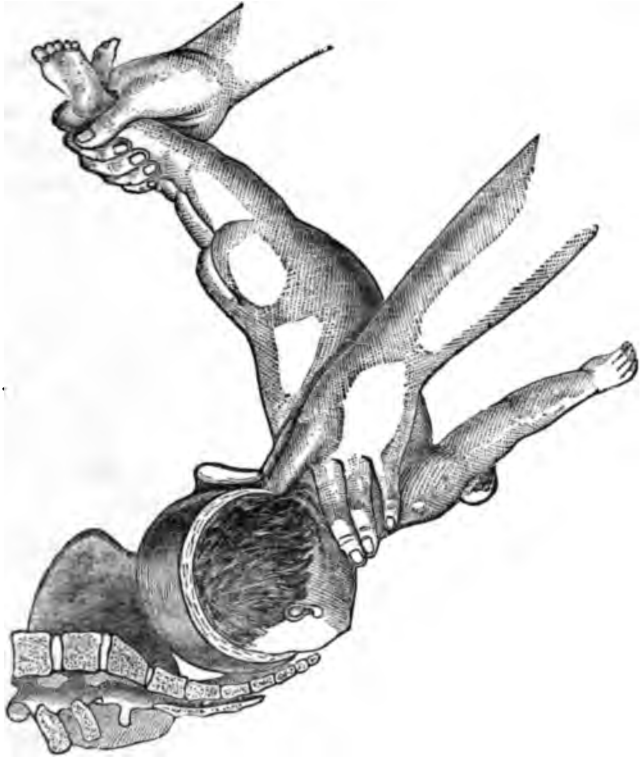

FIG. 69.—THE PRAGUE METHOD: SECOND STAGE (LUSK).

In its performance the feet are seized by one hand and the body drawn as far backward as the perineum allows; the other hand is then hooked over the shoulders, and traction is made by both hands simultaneously (Fig. 68). As the head enters the excavation the body is swung rapidly upward, and the remainder of the delivery is accomplished by upward traction on the feet, while the hand upon the neck promotes flexion by retarding the descent of the occiput (Fig. 69).

If by any clumsiness on the part of the operator the abdomen of the child has been directed to the front during the liberation of the arm, and the chin is therefore arrested at the symphysis, the Prague method should be used throughout. In this case the direction of the first traction should be nearly horizontal, and, as the occiput descends, the body of the child should be raised until, when the head emerges from the vulva, the line of traction is nearly parallel to the mother's abdomen (Fig. 70). The chief disadvantage of the Prague method lies in the fact that all the force exerted by the operator is expended upon the child's neck, and that the amount of force which can be safely applied is therefore less than in the combined method.

Forceps to the After-coming Head at the Superior Strait.— The use of the forceps is generally believed to be the most powerful and certain means of overcoming difficult cases of high arrest of the after-coming head. The operation is, however, often difficult, and the time occupied in the application of the forceps may be of vital importance to the child. Moreover, there are but few cases in which a skilled operator, aided by efficient supra-pubic pressure, fails to deliver by manual extraction; but as such cases do occasionally occur, the forceps should always be at hand before version is attempted.

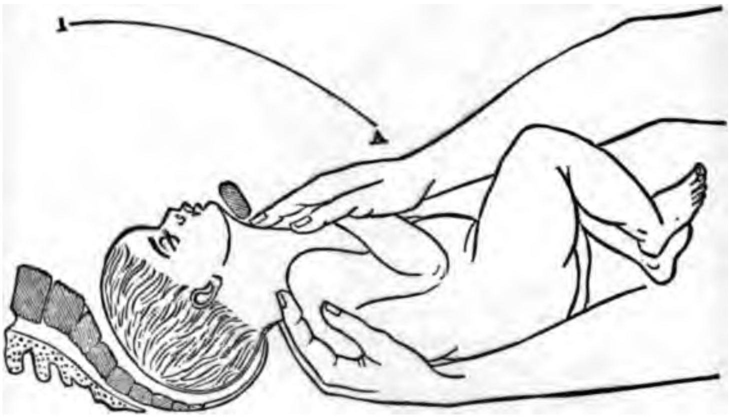

FIG. 70.—THE PRAGUE METHOD: CHIN TO THE FRONT (LUSK).

If forceps be used, the body should be raised to a nearly vertical position, and the forceps should be passed into place upon the sides of the head beneath the abdomen of the child. An axis-traction model should be preferred. This is especially emphasized by a recent case in which a living child was delivered with ease by axis-traction forceps, after manual extraction and the ordinary Vienna forceps had successively failed to deliver, though in the hands of a skilled operator.

Arrest from Extension of the Head.—This condition is rare unless in improperly conducted extractions, and when it occurs may often be overcome by internal pressure upon the face of the child, aided by supra-pubic pressure upon the forehead; but if these measures fail, the body should be swept upward over the mother's abdomen, when traction upon the shoulders will draw the occiput over the perineum, Fig. 70). If forceps are necessary, they should be applied under the child's body, and should extract by the same mechanism.

Arrest at the Inferior Strait or on the Perineum.—Cases in which manual extraction by the combined method fails to overcome a low arrest are extremely rare, but if forceps be required the application and extraction are always easy.

Arrest Due to Contraction of the Pelvis.—In the ordinary forms of contraction the arrest is always at the brim, and after the head has passed the superior strait the subsequent delivery is easy.

Justo-minor Pelvis.—A breech presentation should never be allowed to persist as such in a justo-minor pelvis, but if it has not been corrected the inevitable arrest of the head at the superior strait should be met by extreme flexion, and the application of forceps, to be followed by craniotomy if not promptly successful.

Flat Pelves.—In all flat pelves, and in flat pelves only, the head enters the superior strait in the transverse diameter, and the passage of the strait is most easily effected in a somewhat extended position, in which the bi-parietal diameter is received by one of the sacro-iliac notches, while the lesser bi-mastoid diameter is opposed to the contracted conjugate; if, then, the hand, when it is passed into the vagina for combined traction, finds the head transverse, it should allow extension to go on until the face begins to approach the side wall of the pelvis, or until the greatest diameter of the head has passed the superior strait; and when this has occurred flexion should be promptly restored, and rotation and delivery will then rapidly follow.

In simple flat pelves the application of forceps to the after-coming head is rarely successful after manual extraction has failed; but in pelves of the universally contracted, flat type, if the transverse diameter is markedly diminished, the mechanism approaches that of a normal or justo-minor pelvis, and, if the breech present, and efforts at manual extraction of the head fail, the application of the forceps may be tried.

MANAGEMENT OF FOOTLING PRESENTATIONS.—The treatment of footling cases is in no way different from that which is proper to the whole breech, with the single exception that, if rapid extraction is necessary, there can be no question as to choice of operation.

Transverse Presentations.

MECHANISM.—Spontaneous delivery is rarely possible in transverse presentations at term. The mechanism by which it can occur with very small children has been explained already on page 177, under Version in transverse presentations.

PROGNOSIS.—The prognosis of transverse presentations for mother and child is entirely dependent upon the date of their recognition. If they are recognized at the beginning of labor, and before the rupture of the membranes, the prognosis to the mother is in no way worse than that of normal labor, while the prospects for the child are but very slightly altered: but when such presentations are unrecognized, and are permitted to proceed until general retraction of the uterus sets in, they can be relieved only by a version, which is certain to subject both mother and child to the most grave dangers; or by a destructive operation, which sacrifices the child in the interests of the mother.

MANAGEMENT OF TRANSVERSE PRESENTATIONS.—If, at the time when the presentation is diagnosticated, the membranes are unruptured and the presenting part is unengaged, four operations are possible, external or bipolar cephalic version and external or bipolar pelvic version, and they should be preferred in the order in which they are given. If bipolar version fails, resort must be had to the immediate performance of the internal podalic operation.

If the condition of the uterus is such that this operation is thought to be too difficult or too dangerous to the mother to be properly justifiable, decapitation or exenteration must be resorted to.

Prolapsed Extremities.

PRESENTATION OF THE HEAD AND HAND. MECHANISM AND PROGNOSIS. When the hand prolapses by the side of the head, it is most commonly placed at one end of the bi-temporal diameter; its presence then commonly results in delay, from the increased size of the presenting part, and may occasionally interfere with rotation. The prognosis is that of the operative treatment which may be necessary.

MANAGEMENT.—The presentation is unlikely to be detected until there has been sufficient delay to warrant a high examination; when it is discovered, an attempt should be made to push back the hand with the fingers, and, if this fails, forceps should be applied to the head, when the friction of the pelvic wall will usually delay the hand, while the head advances under the force of the instrument. In this application great care must be taken to avoid including the hand, wrist, or forearm in the grasp of the blades; for such an error would surely result in the production of one or more fractures.

In the less common cases in which the hand is prolapsed by the side of the occipital end of the head, that part is frequently delayed by its presence, while the comparatively unobstructed sinciput descends. This motion, of course, results in the production of extension, which may even proceed to the establishment of a brow presentation. If the accident is detected before marked extension has occurred, it should be treated by an attempt to replace the hand and the application of forceps, or by version. If marked extension is already present at the time when the diagnosis is made, the obstetrician should endeavor to replace the hand and flex the head manually, unless prolonged labor has already effected the configuration of a brow. In this case, or if an attempt at reposition fails, he should resort to version.

PRESENTATIONS OF THE HEAD AND FOOT.—This presentation is decidedly more rare than that of the head and hand. Their consequences and treatment are identical.

PART V.—PATHOLOGY OF LABOR.

CHAPTER XVII.

CONTRACTED PELVIS. INTRA-PELVIC TUMORS. ATRESIA.

Contracted Pelves.

THE almost universal neglect of pelvimetry by American physicians is commonly excused on the ground that these deformities are seldom or never seen among American women; but this view is undoubtedly erroneous, and is the result of an ignorance which is properly held by European authorities to be a standing reproach to the profession of this country.

In a recent analysis of the percentage of contracted pelves among the native and foreign-born women of the out-patient department of the Boston Lying-in Hospital,[1] it was found that nearly two out of every hundred American-born women showed some evidences of contraction, though it was usually slight, and was in every case of the justo-minor type; while among the foreign-born women of the clinic the proportion of deformity reached nearly six per cent.

It must be admitted that an attempt to manage such cases without a knowledge of their peculiarities must often lead to unnecessary loss of fœtal life and laceration of the maternal tissues; and it is evident that a competent knowledge of these malformations is necessarily of great value to physicians whose practice lies among the foreign-born population of our cities, and that even those whose obstetric opportunities are limited to our native women are not safe in wholly neglecting the study of contracted pelves.

DIAGNOSIS.—Unfortunately there are few external peculiarities which can guide us to a suspicion of the existence of pelvic deformities. So far as such warnings do exist they are to be found in an excessively small size of the patient, or in the pres-

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[1] Tran . Amer. Gyn. Soc., 1890.

ence of narrow hips in tall, slender women; in relative shortness of the limbs; in lameness due to diminished length of one leg; in abnormal curvature of the spine or undue hollowness of the back, which suggests the probability of an excessive inclination of the pelvis; and in the history of a previous rachitis. The existence of any such peculiarity is always sufficient reason for a careful pelvic examination during the later months of pregnancy; and this will be but seldom resisted by the patient if the necessity for its employment is plainly represented to her. During labor, several conditions of much more moment in pointing to the existence of contraction may be observed. In the first stage the head rarely engages early, and it is often difficult to reach any presenting part; the non-descent of the head prevents the complete occlusion of the lower uterine segment and, if the membranes be elastic, results in the protrusion of a long sausage-like bag through the partially dilated os, while after rupture the whole or greater part of the liquor amnii is not infrequently at once discharged, to be followed usually by more or less re-contraction of the cervix, which is no longer subjected to the action of the intra-uterine forces, since the head is unable to press against it. If the head is relatively large enough to form an efficient obstacle, the progress of active labor without advance of the presenting part renders the patient peculiarly liable to the occurrence of constriction or retraction rings, after the appearance of which but little is to be hoped for from a longer continuance of natural labor. Malpresentations and prolapse of the cord are relatively common; and further and still more suggestive evidence is to be derived from the alterations of mechanism characteristic of the different types of deformity.

Among the many pelvic malformations usually described but three are of sufficiently frequent occurrence in America to be worthy of mention—the symmetrically contracted or justo-minor; the simple flattened; and the flattened, generally contracted pelvis. The differential diagnosis between these forms must depend upon a careful external and internal measurement, and on an internal palpation of the pelvis in question. Of the external measurements, three only are of practical value. These are the distance between the anterior superior spines of the ilium, the greatest distance between the external surfaces of the iliac crests, and the external conjugate diameter, or "Diameter of Baudelocque." The only internal measurement which can be accurately taken is the diagonal conjugate at the brim, from which by proper subtraction the true obstetrical conjugate can be calculated. The internal examination should, however, always include a thorough and extensive palpation of the walls of the pelvis, if possible by the half-hand.

The height of the promontory above the brim, the length and degree of inclination of the symphysis, the depth of the ilio-sacral notches, and the degree of curvature of the ilio-pectineal line, the amount of curvature of the sacrum, and the length of the pelvic axis as a whole should also be observed. The determination of these points is largely a matter of judgment, and dependent upon experience; for which reason it should be the routine habit of the student to practise this examination upon every parturient woman who comes within his observation; and he who adopts this rule for every normal pelvis in which the administration of ether makes it possible, will rarely fail to form a conclusive diagnosis of the form of contraction with which he is dealing, when confronted by a contracted pelvis.

External Measurements.—The external measurements of the pelvis can only be taken with accuracy by means of a pelvimeter (Fig. 71). The distance between the spines of the ilium is to be measured by placing the tips of the instrument against the anterior superior spines, just external to the origins of the recti-femoris muscles, and is normally, in American women, about ten inches. The distance between the iliac crests is obtained by placing the points against their external aspects, and then moving them backward and forward until the point of greatest distance is found. This diameter averages about ten and three-quarter inches. The external conjugate diameter is taken by so placing the pelvimeter that one point is pressed against the upper edge of the symphysis pubis, while the other rests in the median line below the spine of the fifth lumbar vertebra, a point which may be roughly stated as being that which gives the smallest measurement obtainable from any point of the median line in this immediate neighborhood. It is on the average about seven inches long, but these last two diameters are liable to considerable variation in accordance with the varying stoutness of the patient; the distance between the spines being the less affected, while the external conjugate is distinctly unreliable, in all but thin women.

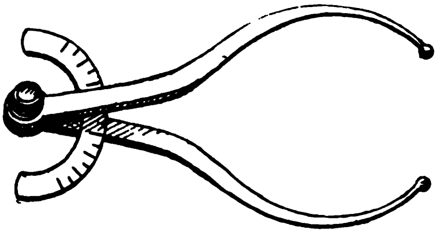

FIG. 71.—THE PELVIMETER.

Internal Measurements.—The length of the diagonal conjugate diameter is obtained by the passage of two fingers into the posterior cul-de-sac, when, by pressing them onward and as much upward as possible, the tip of the middle finger is made to reach the promontory of the sacrum; the radial edge of the index is then pressed closely against the lower edge of the symphysis, and their point of contact is marked off by the nail of the other index finger. The two fingers which have been used in the measurement are then withdrawn from the vagina with as little alteration of their position as is possible, and the length of the diagonal conjugate is ascertained by measuring them with the pelvimeter. The fingers of the half-hand are then made to palpate the entire internal surface of the true pelvis so far as it can be reached, and to note especially the length and degree of inclination of the inner surface of the symphysis, and the height of the promontory above the brim, in order to form an accurate estimation of the shape of the triangle (Fig. 72) from which the true conjugate is to be calculated. It has been found by experience that the amount which should be subtracted from the diagonal conju-

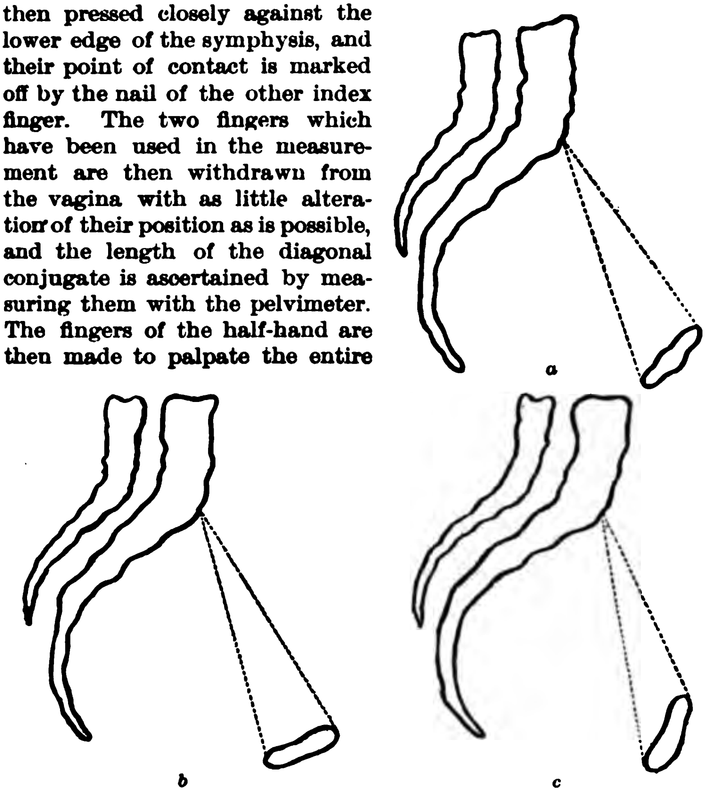

FIG. 72.—CALCULATION OF THE TRUE CONJUGATE FROM THE DIAGONAL CONJUGATE. *a*, Normal inclination of the symphysis to the pelvic brim; *b*, diminished angle between the symphysis and the pelvic brim; *c*, increased angle between the symphysis and the pelvic brim.

gate to obtain the conjugata vera varies ordinarily between one-half and three-quarters of an inch. It is evident (Fig. 73) that this variation must grow less with a decrease in the inclination or length of the symphysis and with a diminution in the height of the promontory, and that it increases as these characteristics are reversed; but the exact amount to be deducted in the individual case must depend largely upon the judgment and experience of the obstetrician.

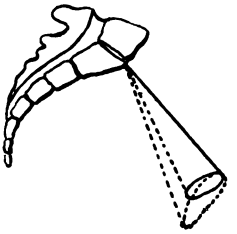

FIG. 73.—VARIATION IN THE SUBTRACTION FROM THE DIAGONAL CONJUGATE IN ACCORDANCE WITH THE VARYING HEIGHT AND INCLINATION OF THE SYMPHYSIS.

When the inclination of the brim and the height of the promontory are normal, one-half inch should be subtracted if the length of the symphysis is less than one and a half inches, and three-fourths if it exceeds that length.

SIMPLE FLAT PELVIS.—This variety of malformation is most common among the Irish portions of our population, though it is not uncommon among the Germans. In it the external transverse measurements (*i.e.*, those between the spines and crests) are but little if at all decreased, while the external conjugate is distinctly lessened. Internal palpation shows the transverse space to be ample, and the sacro-iliac notches of about normal depth; the symphysis is short, and the angle of its inclination to the brim is normal or diminished; the longitudinal curve of the sacrum is markedly increased, the promontory is low, and the pelvis as a whole is short (Fig. 74). The inferior strait is but little if at all diminished in size, and the obstacle to labor is wholly, or almost wholly, at the brim. The head enters such a pelvis in the transverse position, and is commonly extended at the brim;

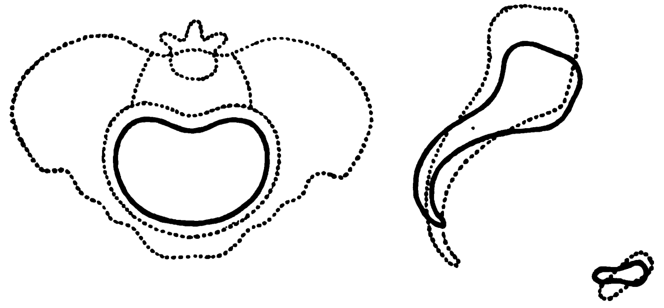

FIG. 74.—CHARACTERISTICS OF THE SIMPLE FLAT PELVIS (*exaggerated*). The dotted line represents the normal pelvis.

but it regains flexion upon entering the excavation, and its progress is subsequently normal.

In breech presentations, or after version, the head enters transverse, but the narrowed conjugate then receives the bitemporal diameter, while the wider biparietal corresponds to the greater space opposite one ilio-sacral notch. Traction upon the body causes slight extension of the head until the resistance of the conjugate has been overcome, when flexion must again recur to permit the passage of the excavation and of the inferior strait.

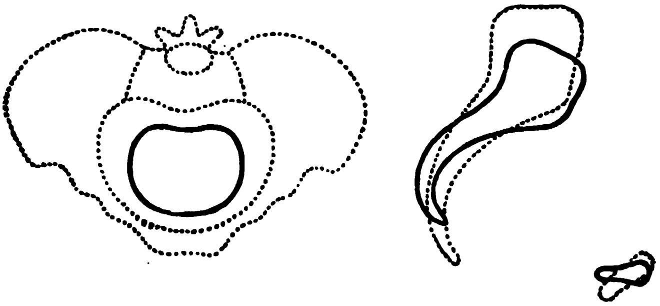

Fig. 75.—Characteristics of the Generally Contracted, Flat Pelvis (*exaggerated*). The dotted line represents the normal pelvis.

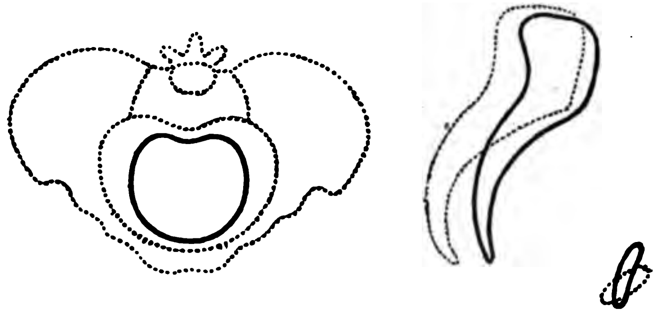

Fig. 76.—Characteristics of the Justo-minor Pelvis (*exaggerated*). The dotted line represents the normal pelvis.

Generally Contracted Flat Pelvis.—This pelvis is most commonly seen in this country among English and Germans. The general characteristics of these pelves are the same as those just described, but the external transverse measurements are here decreased, though to a somewhat less extent than the external conjugate. An internal palpation shows the transverse space at the brim to be correspondingly diminished (Fig. 75). The obstacle to labor is mainly at the superior strait; the head enters transversely, but the pressure upon the sinciput consequent on the diminished transverse space renders extension less likely to occur.

JUSTO-MINOR PELVIS.—This pelvis, which is in Europe the most rare of the familiar forms, is in America the most common, and is the only type which is found with any frequency among our native women. In justo-minor pelves the promontory is high and the sacrum long and straight; the symphysis is long, and the angle of its inclination to the brim is increased. The shape of the inlet is round, the sacro-iliac notches are shallow, the axis of the pelvis is long, and the external measurements are symmetrically decreased (Fig. 76). The obstruction to labor is not limited to the superior strait, but continues through the whole pelvis. The mechanism is that of early and complete flexion, with occasionally a delay in rotation from decreased inclination of the inferior pelvic planes.

Treatment of Contracted Pelves.

VARIATION IN THE SIZE OF THE CHILD.—If all of the heads of unborn children were of uniform size and consistency, the division of contracted pelves into classes would be easy, and the determination of the treatment which should be adopted would be a mere matter of pelvic measurement; but in practice the indications vary widely in accordance with the variation in the size and ossification of individual fœtal heads, as would indeed be expected when it is remembered that the normal variation in the size of the child at term can hardly be stated within lesser limits than from five and a half to twelve pounds; while the consistency of its cranial bones may vary from that of stiff cardboard to almost the rigidity of a metal plate. The difference in the size of premature children at the same period is perhaps even greater than obtains at term.

The variation of the results of labor in pelves of given size and shape in accordance with the varying size of the child is well shown by the following tabulation of a series of thirty-nine unselected cases.[1]

Eight simple flat pelves with conjugates of three and three-quarter inches resulted in no craniotomy, four versions, one forceps, and three normal labors.

Four justo-minor pelves with conjugates of four inches resulted in no craniotomies, three forceps, and one normal labor.

One generally contracted flat pelvis with a conjugate of four inches resulted in version.

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[1] Many of these women were delivered in subsequent labors by the natural efforts, after the induction of labor.

Six simple flat pelves with conjugates of three and one-half inches resulted in one craniotomy, three versions, and two normal labors.

Two justo-minor pelves with conjugates of three and three-quarter inches resulted in two forceps cases.

Four generally contracted flat pelves with conjugates of three and three-quarter inches resulted in no craniotomies, two versions, two forceps, and no normal labors.

Two generally contracted flat pelves of less than three and one-half inches in the conjugate (2¾, 3¼) resulted in two craniotomies.

Three justo-minor pelves with conjugates of less than three and three-fourth inches (3, 3¼, 3½) resulted in three craniotomies.

The duty of the obstetrician when confronted by a contracted pelvis must then be to make accurate measurements, and to diagnose with care the type of its deformity, and thus determine to which class of pelvis it would belong if the child was of average size. He should then estimate carefully the size of the child, and modify the plan of treatment proposed in accordance with his opinion of its size.

Estimation of the Size of the Child.—This is to be determined by bimanual palpation of the body through the abdominal walls, and an attempt to thus form an estimate of the probable size and weight of the child. The biparietal diameter which should correspond to this estimated weight should then be learned by reference to the subjoined table:

Weight of Child.	Size of Biparietal Diameter.	Average Period of pregnancy at which these weights and measurements are attained.	Corresponding Conjugate diameter in Justo-Minor Pelves.	Corresponding Conjugate diameter in Simple Flat Pelves.
3 –3½ lbs.	2¾–3 inches.	32 weeks.	3 inches.	2¾ inches.
3½–4 "	3 –3¼ "	34 "	3¼ "	3 "
4 –5 "	3 –3½ "	36 "	3½ "	3¼ "
5 –6 "	3½–3¾ "	38 "	3¾ "	3½ "

It must be noted that the period of pregnancy at which these weights and measurements are attained is subject to extreme variations.

In generally contracted flat pelves the conjugate diameter which is appropriate to a given head must vary from that recommended for the simple flat and that which is appropriate to the justo-minor type, in accordance with the amount of transverse contraction present.

The probable consistency of the head should then be estimated by bimanual palpation, both through the abdominal walls and with one hand in the vagina. If the patient be a multipara, the results obtained by physical examination should be contrasted with the history of her previous labors; it being a rule that the size of the child increases slightly in successive pregnancies, except that if the birth of a girl follows that of a boy the size may be the same or somewhat less. The determination of the probable amount of disproportion between the individual head and pelvis is always a matter of such great difficulty, and the responsibility of the decisions which must result from its determination are so extremely great, that it should never be undertaken without a formal consultation.

CLASSIFICATION OF CONTRACTED PELVES.—The treatment of deformed pelves is determined, first, by the degree of contraction, and, second, by the type of deformity present. Contracted pelves are conveniently divided into three classes, by degree of contraction—

(*a*) Those pelves in which the diminution of space is so slight that the delivery of a living child at term by the ordinary obstetrical operations is probable, and in which, if these fail, extraction after craniotomy is likely to be easy. Pelves of this class may indicate the induction of labor, the use of forceps, version, or craniotomy.

(*b*) Pelves so much contracted that the delivery of a living child at term is improbable or impossible, and that extraction after craniotomy at term would probably be difficult and dangerous, but which afford sufficient space to permit the probable delivery of a premature living child after the induction of labor. Pelves of this class may be treated by the induction of labor, the Cæsarean section, or craniotomy preceded or not by the use of forceps or version.

(*c*) Cases in which the contraction is so extreme that the delivery of even a premature child alive is impossible, and that the extraction of any child after craniotomy would necessarily be extremely difficult and dangerous. Such cases demand the performance of abortion, laparatomy for sterilization, or the Cæsarean section.

With children of average size, *i.e.*, between six and seven pounds in weight, it may be stated as a rule that justo-minor pelves with conjugate diameters of more than three and three-quarters inches, and simple flat pelves whose conjugates exceed three and one-quarter inches, may be placed in the first class (class *a*); justo-minor pelves of from two and three-quarters to three and three-quarters inches in the conjugate, and simply flattened pelves[1] of from two and one-half to three and one-quarter inches belong to class *b*; justo-minor pelves of less than two and three-quarters inches and simple flat pelves of less than two and one-half inches belong to class *c*. Generally contracted, flattened pelves must be classified by the ratio which obtains between the diminution of the conjugate and of the other diameters in each of the individual cases, since in those in which the transverse contraction is especially marked the indications afforded by a given size of conjugate approach somewhat closely to those stated under justo-minor pelves, while in cases where the antero-posterior shortness is much the more marked they differ but little from those of the simply flattened form.

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[1] Simple flattening to this degree necessarily implies a considerable diminution in the transverse, but the term is used to emphasize the fact that the transverse space is ample as compared with the conjugate.

TREATMENT—CLASS *a*.—When the size of the pelvis and the estimated size of the child lead the attendant to believe that the case belongs to the class in which natural delivery at term is possible, the case should be left to nature unless the usual indications for operation arise. During the first stage great pains should be taken to avoid a premature rupture of the membranes; the patient should be kept in bed and cautioned to avoid all bearing-down efforts, and the condition of the uterus should be carefully watched, both by palpation and by observation of the ratio between the pains and intervals. If the pelvis is of the flattened form, in which version is the operation of election, it is wise to resort to operative interference with the first appearance of any alteration in the condition of the uterus, since the formation of a retraction or constriction ring adds greatly to the difficulties and dangers of turning; but in well-marked justo-minor pelves, in which version is almost absolutely contra-indicated, the case may be allowed to proceed until the condition of either the mother or child leads the attendant to believe that delivery by the natural forces is unlikely to occur.

CHOICE BETWEEN VERSION AND FORCEPS IN CONTRACTED PELVES.—When the head is arrested at the brim of a contracted pelvis, and a conservative operation is possible, the choice between version and forceps should depend on the form of contraction present.

Justo-minor Pelves.—Version should never be performed in justo-minor pelves. The general diminution of all the diameters makes the intra-pelvic space so small that the release of the arms can rarely be accomplished in time to save the child; moreover, the friction against the sinciput due to the diminution of the transverse and oblique diameters makes it extremely difficult to preserve flexion during the extraction of the after-coming head, and thus renders the rapid passage of the pelvis, which is necessary to success in this operation, unlikely to be effected; forceps should therefore be preferred, and if they fail it is best to proceed at once to craniotomy.

Simple Flat Pelves.—In flat pelves, on the other hand, the mechanical conditions are such that, if the transverse space be ample, the after-coming head adapts itself to the brim more easily, and can be extracted by much less force, than is required for the delivery of the fore-coming head. In a simple flat pelvis the head in any case enters transverse and somewhat extended, and the bony resistance of the pelvic brim is exerted mainly upon the sides of the head. When in such a case the after-coming head is brought to the brim, the narrow base of the skull passes the conjugate with ease; and when the wider bitemporal and biparietal diameters have engaged the head becomes elongated under the influence of the tractions, the ample transverse diameter of the pelvis offers no opposition to an increase of the occipito-frontal diameter of the head, and, a compensatory increase in two directions being thus provided for, the flattening of the third, which is alone exposed to pressure, is readily accomplished, and the head passes. On the other hand, when the vertex of the fore-coming head meets the resistance of a flattened conjugate which is decidedly too small for it, the effect of the intra-uterine pressure upon the base of the skull is necessarily to shorten the vertical diameters of the head, a decrease which must

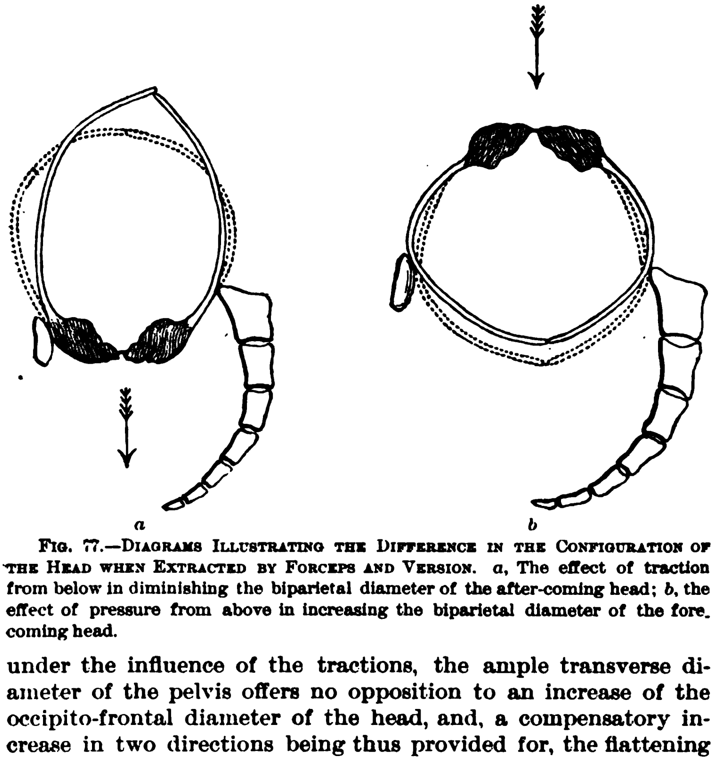

FIG. 77.—DIAGRAMS ILLUSTRATING THE DIFFERENCE IN THE CONFIGURATION OF THE HEAD WHEN EXTRACTED BY FORCEPS AND VERSION. *a*, The effect of traction from below in diminishing the biparietal diameter of the after-coming head; *b*, the effect of pressure from above in increasing the biparietal diameter of the fore-coming head.

of course be compensated for by a corresponding increase in both the other directions, not only in the unimportant occipito-frontal, but also in the very diameters which are already too wide, namely, the bitemporal and biparietal (Fig. 77). This pressure from above on the base of the skull, whether exerted by the uterus or by the tips of the forceps blades, tends to mould the head into a shape which is unfit to pass the brim of a flat pelvis, while traction from below on the condyles of the after-coming head is a direct agent in effecting a fit configuration. In addition to this, the fact that in such a case the forceps must always be applied to the sides of the pelvis, or at best in an oblique diameter, and that in consequence the approximation of the blades must compress the occipito-frontal, and therefore tend to cause still further lengthening of the bilateral diameters of the head, is another argument against its use.

These theoretical considerations have been confirmed by the practical experience of the majority of obstetricians, and it may be laid down as a rule that the existence of a simple flat pelvis is an indication for version, if any operation is necessary, and a contra-indication for forceps.[1]

Generally Contracted Flat Pelves.—As pelves of this type present every possible gradation from those in which the transverse shortening is hardly more than is common in the simple flat pelvis, to others which can hardly be distinguished during life from those of the justo-minor type, so, too, the mechanism of labor and the choice of operations vary with the proportions of the individual pelvis between these two extremes.

In doubtful cases the choice is often difficult; but as forceps, if unsuccessful, can be followed by version, while an unsuccessful version means the loss of a child, it is usually good practice to give forceps the preference if doubt is felt.

If these conservative operations fail, it is best in this class of pelves to prefer craniotomy to the Cæsarean section, upon the ground that a reasonably easy extraction after craniotomy is attended by almost no maternal mortality, while late Cæsarean section is extremely dangerous to both patients; and in pelves of this class, at least, the life of the mother is worth far more than the doubtful existence of the child, whose vitality has, in all probability, been already seriously diminished by the exhaustion of prolonged labor or of unsuccessful operations, since the induction of labor in subsequent pregnancies may enable her to replace the life destroyed in this labor by those of many subsequent children. The necessity for craniotomy is sufficient proof of the fact that the obstetrician was wrong in assigning the individual case to the class in which pregnancy may be allowed to proceed to term, and that in subsequent labors he should relegate it to class *b*.

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[1] Some recently invented forms of antero-posterior forceps, intended for application to the sides of the head in transverse positions, may in the future somewhat extend the scope of the forceps operation in these cases.

TREATMENT—CLASS *b*.—When the history and the results of physical examination assign the case to the class in which labor at term is likely to necessitate craniotomy or the Cæsarean section, but at seven or eight months may probably result in the delivery of a living child, the treatment must be divided into the management of cases which are seen during pregnancy, those which are not diagnosticated until the beginning of labor, and those where the deformity is unrecognized until labor has been present for a prolonged period or until after some of the ordinary operations have been attempted.

Cases Seen During Pregnancy.—When such cases come under the care of the obstetrician during pregnancy, the choice of treatment lies between the induction of labor and the performance of the section. The induction of labor is attended by such slight risk to the mother, and the lives of premature children can so frequently be preserved under modern methods, that the Cæsarean section, even under the conditions of the present day, is unfit to compete with premature labor when the latter expedient is possible.[1] The size of the child should be estimated by bimanual palpation, and the probable biparietal diameter of its head should be ascertained by a reference to the table on page 251. The pelvis should then be carefully measured, the proportion between the two results should be observed, and the examination repeated at short intervals until it is thought that the proper time for the induction of labor has arrived. The point which should be aimed at is the attainment of a difficult normal labor or an easy operative delivery; and in case of mistake—that is, if the labor is too easy or if the operation is too difficult—the date of induction should be altered to correspond with the facts, in case the woman again becomes pregnant. When an operation becomes necessary, the choice between version and forceps is of course to be decided upon the principles already given.

Cases Seen Early in Labor.—When the deformity is only diagnosticated at the beginning of labor, the choice between an early performance of the Cæsarean section and a resort to attempts at delivery by the natural passages, to be followed if unsuccessful by perforation of the head, must depend, first, upon the obstetrician's certainty of the impossibility of delivering a living child, and, lastly, but not less important, upon the choice of the mother and her relatives. If the pelvis is close to the upper limit of the class, and the relative disproportion of the head to it not excessively great, the choice should be given to the more conservative measures. If the adaptation is such that, in the judgment of the attendant and his consultants, delivery by version or the forceps is absolutely impossible, it is important that the prognosis of the case should be fully stated to the family at the outset of labor, and that the choice of methods should be decided upon early, since the results of the modified Cæsarean section when performed early in labor, upon cases which have not been subjected to previous attempts at delivery by the natural passages, have been almost uniformly successful, and in marked contrast to the extreme fatality which still exists among late and secondary abdominal deliveries.

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[1] Except that at the lower limit of this class, the chance for the child is so small that the section should often be considered.

Cases Seen Late in Labor.—If the deformity is not recognized until after the performance of unsuccessful attempts at extraction through the pelvis, or until uterine exhaustion has supervened, craniotomy should be performed, in all cases in which the size of the pelvis makes it possible without extreme danger; since the high mortality of late sections makes them only justifiable in the presence of an absolute indication. If an abdominal operation is necessary, either the Porro-Müller amputation, or laparo-elytrotomy is the operation of choice.

TREATMENT—CLASS *c*—*During Pregnancy.*—When a woman, whose pelvis is so highly contracted that the delivery of a living child at any time is impossible, is seen during the early months of pregnancy, the choice must rest from the start between the immediate induction of abortion and a resort to the Cæsarean section at term. This question is one which must necessarily be decided by the family or by their spiritual advisers. The duty of the physician is to state the probable results of each course of action in plain terms, and to abide by their decision.

In case the mother refuses to consider the Cæsarean section, and repeated abortions become necessary, the propriety of submitting her to a laparatomy for the sake of sterilization is a question which in the present state of abdominal surgery should certainly be raised. Most physicians would probably consider that the chance of death to a healthy woman after a careful laparatomy is so slight as hardly to outweigh the risks of health which are necessarily attendant upon frequently repeated abortions.

The time has certainly not yet arrived, and perhaps never will, when the success of the section is such that the right of the physician to induce abortion in these cases can be open to serious questions upon ethical grounds; but his action in the premises is so likely to be misrepresented that he should always protect himself by the opinion of a consultant before allowing himself to terminate the pregnancy.

At term.—After the child has obtained a size sufficient to obstruct delivery, the performance of the Cæsarean section at the time of election is the only course of action which can be adopted.

Intra-pelvic Tumors.

The new growths and other enlargements by which labor may be obstructed are fibroid tumors of the uterus, prolapsed ovarian tumors, retro-uterine intestinal hernia, cancer of the cervix, vesical calculi, and pelvic exostoses.

FIBROIDS.—Fibro-myomata may be discovered during pregnancy or labor, by either abdominal or vaginal examination. They appear as irregular nodular excrescences connected with the uterus, and are only liable to be confounded with tense, multilocular ovarian cysts, which, when held in close proximity to the uterus by adhesions or the effect of the intra-abdominal pressure, are sometimes differentiated with difficulty. Fibroid tumors often appear for the first time during pregnancy, and, if connected with the upper part of the back wall of the uterus, are often first noticed after delivery; but more frequently their increase during pregnancy is so rapid as to attract then the attention of the patient or her physician. If fibroid tumors are known to exist, the appearance of a sudden and rapidly increasing enlargement of them is always strongly suggestive of pregnancy.

Their obstetrical importance depends upon their situation—whether subserous, interstitial, or submucous—and whether connected with the upper or lower uterine segment.

SUBSEROUS FIBROIDS.—The subserous variety, if small, are of no obstetrical importance; and, even if they are large, the only influence which they exert, is a tendency to the production of premature labor by their encroachment upon the already limited space in the abdominal cavity.

INTERSTITIAL AND SUBMUCOUS FIBROIDS.—*In the Upper Segment of the Uterus.*—The influence of the interstitial and submucous varieties varies with their situation. Those which are attached to the fundus and upper uterine segment complicate parturition only by their tendency to produce irregular and feeble pains, and thus prolong labor, which may also be pathologically painful. They are afterward attended by an increased liability to post-partum hæmorrhage, a tendency to the production of delayed involution, and an increased risk of sepsis from sloughing of the tumor due to the bruising which it may receive during labor, and to the alterations in its blood supply which attend upon the rapid decrease of the uterine circulation during the puerperium.

In the Lower Segment.—Upon the other hand, interstitial and submucous fibro-myomata of the lower uterine segment often offer grave obstructions to the exit of the fœtus. If small, they are extremely liable to cause malpresentations and malpositions; if large, they not infrequently so far fill the pelvis as to become incarcerated within the excavation, and may then render delivery by the natural passages impossible.

Treatment.—Fibroids of the Upper Segment.—Fibroids which are above the brim may so far lessen the contractility of the uterus as to necessitate the use of forceps or version; otherwise they require no treatment.

Incarcerated Fibroids.—The Taxis, etc.—When incarcerated intra-pelvic fibroids are discovered during pregnancy they should be at once lifted above the superior strait by gentle taxis, the patient being placed in the knee-chest position. The attempt should be repeated after a few days if it proves unsuccessful at its first trial. If it succeeds, a re-entrance of fibroids of any considerable size is unlikely; but lest this should occur, the examination should be repeated, and the tumors, if necessary, raised from the pelvis at short intervals until their increased size makes re-entrance impossible.

Interstitial fibroids of the lower uterine segment frequently extend, however, into the pelvis only, and are then often neglected until the advent of labor renders a vaginal examination necessary. The same attempt at raising them from the pelvis by the vaginal or rectal taxis, with the patient in the knee-chest position, should then be resorted to; but if reasonably prolonged efforts of this kind fail to relieve them, the continued use of elastic intra-vaginal pressure should be turned to. This may be produced by the inflation of a rubber colpeurynter within the vagina or rectum, by a weak solution of corrosive sublimate. With the exception of the continued use of this expedient throughout the labor and an occasional repetition of the taxis, the case should then be left to nature, since these tumors are largely muscular in their structure, and are subject to the same processes of softening and retraction with which we are familiar in the cervix; and because, by this process, tumors which seem to oppose a hopeless obstacle are usually entirely effaced and withdrawn above the head in the most surprising manner during the progress of labor. Indeed it may almost be laid down as a rule that no intra-pelvic fibroid tumor is capable of affording so hopeless an obstacle to delivery as to be sufficient cause for an early Cæsarean section. Even though it wholly fills the pelvis, the chances of ultimate delivery by natural labor through the natural passages, after its retraction, are so great that it is better to adopt a conservative policy in the hope of this result,[1] and to resort to craniotomy, forceps, version, Porro's operation, or an operative removal of the tumor in case of its failure and the appearance of exhaustion.

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[1] The author has himself seen, or known personally, four cases of incarcerated fibroids first discovered during labor, three of which were terminated by natural labor, and one by low forceps for failing pains, after the complete retraction of the tumors.

Choice of Operation.—The choice between these operations must depend on the amount of space which has been gained by retraction before exhaustion appears. The patient should be left to the care of nature until her condition warrants a belief that she is unlikely to be strong enough to terminate the delivery herself. A final effort should then be made to raise the tumor by taxis; if that fails, and the intra-pelvic space is sufficient to permit delivery by forceps or version, one of these operations should be done; or if there is not enough room for the delivery of an intact child, craniotomy may be possible. When exhaustion appears before any considerable retraction has been effected, the choice lies between a vaginal extirpation of the tumor and a Porro's amputation of the uterus.

If the tumor is accessible and distinctly pedunculated, it may be readily detached by the use of the scissors or écraseur. If it is readily accessible and attached to the uterus by a broad base, it may be enucleated by an incision through its capsule, and the removal of the tumor, piece by piece, by the use of the scissors, or of Thomas's serrated spoon, to an extent sufficient to permit the passage of the child. This operation is, however, so difficult and dangerous that it should not be attempted unless the tumor is very readily accessible.

When retraction fails and the enucleation of the tumor is thought to be inadvisable, Porro's operation should be performed; and since the prognosis is greatly influenced by the condition of the patient at the time when it is undertaken, it should be performed so soon as a rising maternal pulse gives reason for the belief that the patient's strength is unlikely to endure a continuance of labor till an adequate retraction of the tumors has been produced.

When abnormal presentations or positions are produced by the presence of small fibroids, the operation appropriate to the presentation should be undertaken as soon as the retraction of the tumor affords space for its performance.

When a uterine polypus is discovered for the first time at the conclusion of labor, it should be removed by the écraseur, and its pedicle, if necessary, erased by the curette. Non-pedunculated fibroids should be left untouched, but watched carefully to anticipate the occurrence of sloughing, at the first sign of which the necrosed tumor should be thoroughly removed by the large blunt curette recommmended for the removal of adherent secundines.

OVARIAN TUMORS.—Ovarian tumors of small or medium size may occasionally become prolapsed into Douglas' fossa below the pregnant uterus, and, when so placed, constitute an extremely dangerous complication of labor.

They are to be differentiated from fibroids in a similar position by fluctuation, when that can be obtained; by the mobility which they sometimes show, and by the absence of any attempts at retraction during labor. They should be treated by persistent but gentle efforts at taxis, repeated at intervals until symptoms of exhaustion of the patient appear, or until the descent of the head produces a pressure against them which is sufficient to threaten rupture or necrosis.

When this danger is thought to be present, the vagina should be thoroughly disinfected, and, the perineum being retracted by a Sims speculum, a carefully disinfected aspirating needle should be introduced into the tumor, and its fluid contents should be drawn off. If the cyst is multilocular, and the first aspiration reduces its size without completely effacing it, the attempt to raise it from the pelvis by gentle taxis should be again repeated before resorting to further punctures. The operation of aspiration exposes the patient, under the most favorable circumstances, to considerable danger of a general peritonitis from the escape of the cyst contents into the abdominal cavity; and after such an operation the attendant must hold himself in readiness to relieve this condition by the immediate performance of a secondary laparatomy for the removal of the tumor, and cleansing of the peritoneum, whenever the symptoms of peritonitis appear.

HERNIA INTO DOUGLAS' FOSSA.—This condition is to be diagnosticated by the peculiar feel of the tumor, and by its tympanitic note on percussion, if this is possible; it may be discovered during pregnancy or may remain unsuspected until the advent of labor. It not only forms an obstruction to the passage of the fœtus, but also exposes the patient to grave danger of intestinal obstruction, and should be treated by immediate and persistent taxis in the knee-chest position, if necessary under anæsthesia.

Carcinoma Uteri.—When cancer occurs as a complication of pregnancy, its seat is invariably in the cervix, since cancer of the fundus would render pregnancy an extremely improbable if not impossible event. It should be treated by amputation of the diseased tissues by the écraseur, scissors, or galvano-cautery during pregnancy, immediately before the expected advent of labor, whenever the extent of the infiltration is sufficiently limited to permit the operation, which is not necessarily followed by miscarriage or premature labor. When the disease is too far advanced to render this treatment possible, the case should be allowed to proceed to term and the child delivered by Cæsarean section, since the hopeless prognosis for the mother renders the life of the child the more valuable of the two.

VESICAL CALCULUS.—A stone in the bladder, when impacted between the head and pubic wall, is sometimes mistaken for an exostosis of the symphysis, from which it is to be differentiated by the use of the urethral sound, and by the fact that exostoses are necessarily immovable, while calculi, though fixed during the continuance of the pain, are movable in the intervals. The head should be raised, and an attempt made to urge the calculus above the brim, by pressure exerted upon it with the fingers through the vesico-vaginal septum. If this is unsuccessful, the stone should be removed from the bladder by an incision through the septum, which should be carefully sewn up after labor, and then usually heals by first intention, or, if this fails, can be repaired by a subsequent operation. The operation of litholapaxy is sometimes possible, but is rendered so difficult by the lack of space around the stone as to be usually inadvisable at this time.

EXOSTOSES.—Multiple exostoses of the pelvic bones are not extremely infrequent; they usually spring from the sacrum or symphysis; the latter being the less frequent seat. The treatment to be adopted must depend upon the dimensions and shape of the pelvic canal. The condition differs from the other bony contractions of the pelvis only in the fact that, if the exostoses are irregular in shape and sharply pointed, the danger of producing fatal lacerations of the soft tissues during a pelvic delivery may make a resort to an abdominal operation an imperative necessity.

Atresia.

ATRESIA VAGINÆ.—Atresia of the vagina may be complete or incomplete, congenital or acquired. When complete it is of no obstetrical importance, since pregnancy is then impossible.

Congenital atresia is the result of an imperfect development of the external organs of generation. Acquired atresia is due to cicatricial contraction, either after sloughing of the vaginal walls from prolonged pressure in previous labors, or as the result of deep ulcerations due to diphtheria, typhoid fever, syphilis, or other exhausting general diseases.

Whatever the cause of the condition, it should be left untreated during pregnancy and until the advent of labor, when the presenting part should be allowed to dilate the constriction, under the influence of the uterine contractions, until it is seen that exhaustion of the uterus or of either patient is impending; the ring then should be divided by multiple, preferably lateral, superficial incisions, and the forceps applied. During convalescence a large-sized glass Fergusson speculum should be kept constantly in the vagina, unless its presence prove too irritating, its orifice being plugged with iodoform gauze to avert the danger of sepsis.

ATRESIA UTERI.—In very rare instances the septum of a bipartite uterus may form an obstacle to the advance of the head. If, in such cases, a small hole is made in the septum by a blunt instrument, it is sure to dilate rapidly under the pressure of the membranes or presenting part.

Cicatricial stenoses of the cervix may, very exceptionally, require the same treatment which was recommended for cicatrices of the vagina.

CHAPTER XVIII.

ECLAMPSIA.

ECLAMPSIA is an affection characterized by the appearance of convulsions, both tonic and clonic in character, associated with the state of pregnancy, labor, or childbed, and not due to independent organic disease. The latter restriction being intended to exclude the convulsions of epilepsy, hysteria, and cerebral lesions.

PATHOLOGY.—The etiology of eclampsia has given rise to a great amount of discussion, and the question is by no means thoroughly settled; the two theories which are most generally espoused being, first, that it is a condition of toxæmia due to functional inefficiency of the kidneys; secondly, that the convulsions are dependent upon an abnormally irritable condition of the central nervous system, produced by the hydræmia of pregnancy. The advocates of each theory have attempted to prove that all cases of eclampsia can be explained upon their pet hypothesis; but while some few cases may be of almost purely renal origin, and a still smaller number wholly central and entirely unconnected with the kidneys, it is highly probable that in the vast majority of cases both elements are present, and that one or the other predominates in each individual case; and it is certainly true that, whatever the pathological significance of the case may be, both elements must be recognized in the treatment of almost every patient.

PREMONITORY SYMPTOMS.—In almost every case the advent of convulsions is preceded by a train of premonitory symptoms; and, though cases not infrequently occur in which no such symptoms have been noted, it is probable that they have merely been so slight as to be overlooked by the patient.

The occurrence of œdema of the feet and ankles is so common in pregnancy as to be of no diagnostic importance; but a general œdema, which is most easily detected in the hands and eyelids, is highly suggestive. Another symptom of almost constant occurrence is a dull headache, which is usually slight and generally frontal, and is frequently described as an uncomfortable feeling just behind the eyes. Dimness or indistinctness of vision, sometimes amounting to almost total amaurosis, is frequently complained of. A less common but very noticeable symptom is the sudden appearance of extremely severe epigastric pain, which is usually followed within a few hours by a seizure. Not infrequently the attack is preceded by a slightly confused, stupid condition of the mind or by a sudden access of irritability; but this is often wanting. The changes which appear in the urine are more significant than any other signs. It has long been known that a slight amount of albumin is very frequently found in the urine of pregnant women, but it has only lately been discovered that such women furnish a very much larger percentage of eclampsia than those whose urine is non-albuminuric. A decrease in the quantity of urine, especially if it is attended by the appearance of albumin or casts, is highly prognostic of impending eclampsia.

DESCRIPTION OT THE ATTACKS.—When the attack occurs, it appears in the form of a typical epileptiform convulsion. It is ushered in by a few seconds of complete loss of consciousness; and this is succeeded by a spasmodic contraction of the smaller muscles of the face, which gives rise to a peculiarly unpleasant smile, the risus sardonicus of early medical literature. The eyelids open and shut in rapid alternation; the eye-balls roll upward until the pupil is barely visible; the head is drawn rapidly from side to side; and the thumb is folded into the palm of the clenched hand, which passes rapidly from pronation to supination, and *vice versa*. In severe attacks the forearms are rapidly flexed and extended over the chest, and toward the termination of the convulsion these clonic motions are succeeded by a tonic opisthotonos; respiration stops, the eyes protrude from the sockets, the conjunctivæ are deeply injected, the face becomes cyanotic, and the jaws are clenched, often inflicting serious wounds upon the partially protruding tongue. A temporary rise of temperature follows each convulsion.

The seizures last for from ten seconds to about two minutes, and are succeeded by a coma of varying depth and duration, from which the patient awakes with no memory of the attack.

If the case is left to nature, the convulsion is usually repeated after a longer or shorter time, the intervals between successive convulsions becoming progressively less, and the attacks more severe, while life lasts; each succeeding seizure adds markedly to the gravity of the prognosis for both mother and child. Much doubt exists as to whether the muscles of organic life participate in the attacks or not; but many observers have reported that the uterus not infrequently contracts with extreme force during each convulsion.

PROGNOSIS.—It is one of the most fatal of obstetric accidents and is fortunately comparatively rare, being variously stated as occurring in from 1 in 300 to 1 in 500 labors. It may appear at any period, but is more frequent in the later months of pregnancy, during labor, or in the puerperium. As a rule, the eclampsia of labor is the more severe; but puerperal eclampsia, if the attacks are severe, is rendered very dangerous by the comparative inefficiency of the treatment which it is possible to apply.

The mortality varies greatly with the form of treatment adopted and with the severity of the individual case. When the first convulsions are incomplete, last but a short time, are followed by but brief coma, and are separated by prolonged intervals, both patients may be saved in the majority of instances by energetic treatment. When the attacks are severe and prolonged, and the coma is continuous, the prognosis is almost hopeless. As a rule, the gravity of the situation is somewhat closely indicated by the completeness of the suppression of the urine. The mortality of untreated cases would be enormously great; even under efficient management it is commonly believed to be as high as from thirty to forty per cent.

TREATMENT.—The treatment is divided into prophylaxis, care of the convulsion, and after-care.

Prophylaxis.—The prophylactic treatment should be promptly instituted whenever any of the premonitory symptoms appear, and is the most satisfactory part of the management of eclampsia. It should aim to attain two ends: first, the restoration of tone to the nervous system by securing for the patient complete rest, entire quiet, and the uttermost absence of mental worry, to which a moderate use of such sedatives as bromide and chloral should be added; second, the prevention of any increase of toxæmia, by restricting the patient to a simple milk diet, and by the administration of the tincture of the chloride of iron in full doses; and, finally, the elimination of poisonous materials from the blood by diuresis, catharsis, and sweating.

The urine should be examined frequently to determine both its quantity and quality, since the activity of the treatment must be dependent on its characteristics. The use of any other diuretic than large quantities of water is of doubtful utility; but the vicarious elimination of urea or other toxic substances, by such sweating and catharsis as the strength of the patient permits, is an object of the first importance.

Some form of saline should be administered in small quantities several times daily; the choice between Hunyadi water, citrate of magnesia, seidlitz powders, and Epsom salts being dependent mainly upon the taste of the patient. The use of pilocarpine to ward off impending convulsions has been highly recommended, and strongly disapproved, by authorities of equal reputation. It is, however, rarely if ever necessary as a prophylactic, since it can usually be replaced by the milder and more continuous sweating produced by the use of hot-water bottles or an excessive amount of bed-clothing; in extreme cases, the hot pack or steam bath may be resorted to, or the patient may be placed for twenty minutes in a tub filled with the hottest water which can be borne; but either of these expedients should be followed by her immediate removal to an artificially warmed bed, covered by a large number of blankets. The appearance of the premonitory symptoms of eclampsia during labor should be treated by the administration of chloral in fifteen-grain doses, repeated once or twice at intervals of half an hour; or better, by the prolonged use of ether to a degree of anæsthesia which is sufficient to cause partial unconsciousness without annulling pain. It is always a sufficient reason for the avoidance of any unusual prolongation of labor, and indeed, if the head is already in the excavation, is enough to warrant the application of forceps.

Treatment of Eclampsia during Pregnancy.—With the appearance of convulsions the whole plan of treatment changes. So soon as a convulsion has occurred, a differential diagnosis of its cause should be made. Hysteria is to be excluded by the epileptiform character of the seizure; epilepsy by the history, and by an examination of the urine, which should be immediately drawn by the catheter. If the convulsion was epileptic, a trace of albumin or even a few hyaline casts may be temporarily present, and the specimen will be light and of a low specific gravity; but after eclampsia it is almost invariably scanty, concentrated, and loaded with albumin, and will contain an abundance of granular, or brown granular, casts. When the seizure occurs during the sixth month of pregnancy, or even earlier, some foreign authorities recommend a conservative policy; *i.e.*, the use of chloral or other sedatives, combined with diaphoresis by pilocarpine, the hot pack, or a hot bath, and the free administration of salines, in the hope of avoiding a recurrence of the seizures and of prolonging pregnancy until the child is viable, or even until term; but although this attempt is occasionally successful, it is generally believed in this country that the risk to the mother is so great as to outweigh the faint chance of prolonging the somewhat problematical existence of a premature child; and the plan usually adopted here is to imitate the course of nature, which in a large proportion of cases terminates the affair by the spontaneous occurrence of labor. Carl Braun declares he has never known but one patient to recover between the fourth and sixth month of pregnancy, except where abortion had taken place; and since the induction of labor furnishes a considerable proportion of recoveries, it seems to be the only plan which can be recommended for use in well-marked cases.

Treatment during Labor.—A capable attendant should remain by the bedside, in readiness to administer ether at the first sign of a second convulsion; should it appear, the ether should be crowded down, and the tongue should be protected from laceration by the insertion of a cork or piece of wood between the teeth, or better by passing a folded handkerchief between the jaws, after the fashion of a bit, in order to retain it within the mouth. The patient should never be left alone for an instant until delivery has been completed, and the induction of labor should ordinarily be begun as soon as the necessary preparations can be made.

When but a single convulsion has been observed, and the patient is in fairly good condition, it may seem heroic to recommend immediate delivery; but experience shows that when this treatment is adopted, the mother is usually saved unless the attack is very exceptionally severe, and that, when the patients are permitted to have a number of convulsions, a large proportion are invariably lost; moreover, each succeeding convulsion greatly diminishes the vitality of the child. When the patient has been suffered to endure convulsion after convulsion, and is completely comatose, the shock of a forced delivery may be immediately fatal, and every precaution should be taken to minimize it; but since a continuance in this condition is necessarily and inevitably fatal, the best chance for the mother rests in immediate and gentle delivery under full anæsthesia, though even this chance then offers but little hope. The method to be chosen is not a matter of unimportance; the slower methods, which work by irritation of the uterus, are distinctly to be advoided, as being likely, in themselves, to excite fresh seizures; the plan to which preference should almost uniformly be given being surgical anæsthesia and manual dilatation of the os; which should, however, be even more slow and gradual than usual, since the element of hurry which may enter into this operation when indicated by other conditions, *e.g.*, hæmorrhage, is absent in eclampsia, and the avoidance or minimizing of local irritation is an object of prime importance. The os should be carried up to full dilatation; and the uterus should be emptied, either by version or by the application of forceps, while the patient is still under ether.

Ergot should be avoided both on account of its alleged unfavorable action in eclampsia intrinsically and because some slight post-partum loss of blood is not an unfavorable circumstance in this condition. After the patient has recovered from ether, she should be continously watched by the nurse, *i.e.*, should not be left alone for a single moment until some days have passed without a convulsion; and the physician should arrange to be within call as much as possible during this interval.

Chloral in doses of from ten to fifteen grains by the mouth, or twenty to thirty by the rectum, should be administered several times daily in all cases except those in which the patient is stolid and quiet and the renal disturbances are extreme, and ether should be given during convulsions. The urine should be drawn by the catheter every six hours unless it is passed at shorter intervals naturally. The total quantity should be carefully recorded and each specimen examined for albumin and casts, since the prognosis in any individual case must depend wholly on the infrequency of the convulsions, the variations of the total quantity of urine, and the amount of albumin and casts found. From the time of delivery a mild diuretic, such as cream-of-tartar water[1] or a weak solution of acetate of potash, should be freely and continuously given. If the pulse be strong and full, and the patient is a vigorous woman, a saline cathartic should be administered as soon as she is able to swallow; or one-sixteenth of a grain of powdered elaterin may be placed upon the tongue, and repeated at intervals of two hours till the bowels have moved freely. No effort should be spared to provoke profuse sweating, it being a general rule, though not without its exceptions, that patients who sweat freely, recover, while those who do not, die. The most prompt and perhaps the most efficient and safest method is the hypodermic injection of one-sixth of a grain of pilocarpine, to be repeated if necessary once; but this should be combined with a free use of hot-water bottles and of an abundance of warm coverings. The objection which has been urged against the use of this drug, that it is prone to cause œdema of the lungs, has certainly some weight, and, in persons afflicted with any pulmonary disturbances, is a distinct contra-indication to its use; but in the majority of cases the danger seems to be slight.

Should pilocarpine fail, or if its use is thought to be too dangerous in the individual case, the same effect may be attained by the use of hot-air or steam baths, the apparatus for which can be extemporized in any household with the aid of a joint of stovepipe. The bed-clothes should be raised above the patient by a cradle, which can be made of barrel hoops if nothing better offers; or by hanging them across a rope stretched above the bed from its top to its bottom, in imitation of the ridge pole of a tent. They should then be tucked very closely around the edges of the bed, and under the patient's shoulders and neck, the stovepipe should be passed into the tent which they make, at a point where it cannot burn the patient's body, and a large alcohol or kerosene lamp should be placed under its dependent end (Fig. 77) if a hot-air bath is desired; or a kettle or other vessel of boiling water may be mounted on a large lamp or an oil stove, and connected with the pipe by thick layers of wet cloth, if steam is to be used; the latter being the more troublesome, but rather the more efficient method. So soon as fairly profuse sweating has been produced, the apparatus may be removed, hot-water bottles placed in the bed, and the patient closely and warmly covered with blankets. Nursing should be forbidden, and absolute quiet and seclusion must be enjoined. The plan described has yielded, upon the whole, better results to those who have used it than has any other method; but several other expedients may occasionally be serviceable, and must be described.

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[1] This is prepared by putting a small pinch of domestic cream of tartar into a tumbler full of drinking water, and is to be preferred to the more active diuretics.

The use of morphia instead of chloral is popular with many physicians, but is objected to by others upon the very rational ground that its tendency to decrease all the secretions more than counterbalances its superior sedative action.

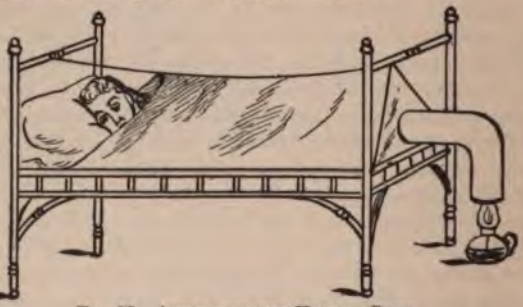

FIG. 78. APPARATUS FOR HOT-AIR BATH.

Veratrum viride in full doses—*i.e.*, Squibb's fluid extract, ten to twenty minims subcutaneously, repeated if necessary in thirty minutes, and continued in five-minim doses by the mouth at intervals sufficiently short to maintain a pulse-beat of not more than sixty to the minute—has been highly recommended, and is especially popular in the southern and western portions of America. Venesection has been frequently recommended both upon theoretical and practical grounds, and should certainly be tried, at least as a last resource and after the failure of other methods, in all cases in which a fatal termination seems likely, and in which the pulse is full and bounding.

Eclampsia during the Puerperium.—Puerperal eclampsia differs from eclampsia during labor only in the fact that no operative treatment is possible; its treatment is the after-treatment of the eclampsia of parturition.

Clear as the indications for treatment are in many cases, the affection is any of its forms is always so serious, and its uncertainties are so many and so great, that it is a wise plan never to undertake the management of a case of eclampsia alone if a consultation can by any possibility be obtained.

CHAPTER XIX.

HÆMORRHAGES BEFORE AND AFTER DELIVERY.

PLACENTA PRÆVIA; CONCEALED ACCIDENTAL, AND POST-PARTUM HÆMORRHAGE.

Placenta Prævia.

PLACENTA PRÆVIA is the insertion of the placenta into the lower uterine segment, *i.e.*, upon that portion of the uterus which is subjected to distention during labor; and this implantation differs from the normal status, not only anatomically, but also in its results. A normally situated placenta is only loosened by the extreme retraction of the uterus which follows the escape of the child; but a prævia is necessarily detached by the expansion of its site during the stage of dilatation. The normal placenta is thus detached at the end of labor and at a time when the mouths of the uterine vessels are closed by the retraction of the muscles; while a placenta prævia is separated at a period when the vessels are being drawn widely open by passive distention of the tissues in which they are placed. The natural result is that, in placenta prævia, the first stage of labor is always complicated by hæmorrhages, which can only be arrested by emptying the uterus, and which frequently reach alarming proportions.

CLASSIFICATION AND NATURAL HISTORY.—Placenta prævia is divided into placenta prævia centralis, where the insertion is such that the fully dilated os is completely covered by the placenta; placenta prævia partialis, where the placenta covers only a portion of the fully dilated os; and placenta prævia lateralis or marginalis, where no more than the edge of the placenta is felt in the os when fully dilated. Closely allied to placenta prævia, both anatomically and clinically, is the condition known as low insertion of the placenta, in which it is not inserted into the zone of the uterus which is to undergo dilatation, but does extend into the area immediately continuous with it. This portion of the wall may or may not be subjected to sufficient alteration to cause the detachment of the placenta, and has been well called the dangerous zone, in recognition of the fact that, although a low insertion of the placenta does not necessarily imply the unavoidable hæmorrhages of a true placenta prævia, it does involve a considerable risk of hæmorrhage, which indeed occurs in a large proportion of these cases.

In placenta prævia the insertion of the cord is so frequently marginal or velamentous that a complication of the placenta prævia by a presentation or prolapse of the cord is extremely common.

The cause of placenta prævia is as yet unknown. It occurs most frequently in multiparæ, and when pregnancy has occurred shortly after the completion of a previous miscarriage or labor. For some reason which is not yet thoroughly understood, the existence of placenta prævia implies an increased liability to breech and transverse presentations, which occur many times more often than under normal circumstances.

A large percentage, and indeed a majority, of cases of placenta prævia result in an interruption of pregnancy between the fourth and ninth months; and the likelihood of premature delivery is greater in proportion to the completeness of the prævia, and increases with the advancement of pregnancy. It is characterisic of the hæmorrhages of placenta prævia during pregnancy that they appear suddenly and without assignable causes. The bleedings is usually slight at first, and increases with each repetition of the hæmorrhage; but no dependence can be placed upon this rule, since the first or second hæmorrhage may sometimes be so profuse as to reduce the patient to a state of extreme collapse, or may even be fatal.

After delivery, the situation of the placental site in immediate proximity to the vagina, and in the less actively muscular, lower zone of the uterus, results in a greatly increased danger of sepsis or post-partum hæmorrhage; and more than usually strict precautions must be observed to prevent their occurrence.

PROGNOSIS.—The prognosis in placenta prævia is that of greatly increased risk to both mother and child, but the amount of danger varies greatly in different cases and is always closely proportional to the completeness of the prævia. The successful termination of a case of central insertion is a feat of which any obstetrician may well be proud; while a marginal insertion involves so much less risk that the lives of both patients should almost invariably be saved by adroit and careful management, and are often preserved by the efforts of nature alone.

DIAGNOSIS.—The occurrence of hæmorrhage without appreciable cause at any period after the third month of pregnancy, *i.e.*, after the formation of the placenta, should give rise to a suspicion of placenta prævia. In cases of marginal or partial prævia, the examining finger may detect a greater thickness and softer consistency of the lower uterine segment upon one side, as compared with the other; the existence of many large pulsating vessels in the uterine wall per vaginam is also a suspicious sign: but the only conclusive point is a recognition of the placental surface by the fingers introduced through the os. The probability that sudden or unexplained hæmorrhage during the last three months of pregnancy is to be explained by the existence of a prævia is so marked, and the dangers of the condition are so great, that the gentle insertion of the finger through the os, in order to determine whether the placenta presents, is usually justifiable when the hæmorrhage has been profuse and this anomaly is suspected, and is to be advised if the os is patulous.

TREATMENT.—*During Pregnancy.*—During the second three months of pregnancy it should be an invariable rule to provoke miscarriage so soon as the diagnosis of placenta prævia is established; and this, not only in the interest of the mother; but because, if a serious hæmorrhage has occurred at so early a period as this, the chance of saving the child by prolonging pregnancy to the period of viability is so extremely small as to be unworthy of consideration.

In the sixth month, and especially in the latter part of the sixth month, the question of whether or no it is wise to attempt to prolong pregnancy until the child is viable is one for which no invariable rule can be laid down. It must be decided in each case, first by the supposed completeness or incompleteness of the prævia, and secondly by the circumstances of the patient. If the insertion be marginal, or at most but partial, and if the patient's social condition makes it possible for her to remain persistently in bed, to have skilled and careful watching, and abundant means for summoning instant help on the occurrence of hæmorrhage, a conservative policy may be permissible. If, upon the other hand, the prævia be wholly or almost complete, if the patient is obliged to attend to her household duties and lives at a distance from the physician's office, the risk to both lives from the continuance of pregnancy is so extremely great that it should not be incurred for the sake of prolonging the problematical existence of a six-months fœtus.

After the seventh month, the dangers incurred by the child in premature delivery are but little, if at all, greater than the risks of death from asphyxia which are involved in the continuance of its intra-uterine life after such a separation of the placenta as is implied by any but the most moderate hæmorrhages. The chances of the child being thus so nearly balanced, the interests of the mother are sufficient to indicate the immediate termination of pregnancy, unless under the most unusually favorable circumstances. If the mother is much collapsed from previous bleeding, or the hæmorrhage at the moment is slight, it is, however, usually best to adopt a conservative policy, in order to delay the shock of delivery until she has been prepared for it by rest and stimulation. In collapsed patients, the extraction should invariably be slow, since such a delivery produces greatly less shock than a rapid extraction, which latter may not infrequently prove immediately fatal to the mother under such circumstances.

In Labor.—When the diagnosis of placenta prævia has been established, the first step in treatment, under all circumstances, should be an effort to insert the finger within the os to its full length; after which it should be made to detach the placenta from the whole of that portion of the lower uterine segment to which it can reach. This separation permits retraction of the uterine wall to occur, and so closes the mouths of the vessel over the whole of the separated surface. It is almost invariably followed by an at least temporary cessation of hæmorrhage. When the absence of dilatation makes even the insertion of the finger impossible, or after this preliminary separation of the placenta has been effected, three methods of further treatment present themselves for selection.

These three methods are: (1) The use of an intra-uterine bougie, of manual dilatation of the os, or rupture of the membranes, to hasten labor; the insertion of the tampon to control hæmorrhage; and then intrusting the remainder of the case to nature. (2) Manual dilatation of the os to a degree sufficient to admit two fingers, and version by the method of Braxton-Hicks, to be succeded by gentle traction on the leg in order to draw the half-breech into close contact with the lower uterine segment, and thus arrest hæmorrhage by direct pressure. (3) Manual dilatation of the os to the degree of full dilatation, internal podalic version, and immediate extraction. The choice between them must depend upon the amount of hæmorrhage, the rigidity of the cervix, and the form of prævia present in the individual case.

Marginal Insertions.—When the insertion is marginal or lateral, the hæmorrhage after detachment is usually slight; and the mere engagement of the head commonly compresses the lower portion of the placenta against the pelvic brim with sufficient force to prevent further bleeding. In this form of prævia, hæmorrhage not infrequently fails to make its appearance until good labor is present, and the os has become considerably dilated; in such cases mere rupture of the membranes is frequently sufficient to arrest it. Even if the hæmorrhage occurs at the beginning of labor, digital detachment, in combination with the acceleration of labor by the methods just enumerated, may be all that is required. If a slight hæmorrhage persists after detachment, it may advantageously be checked by the tampon, which also exercises a decided influence in hastening the advent of labor; but it should always be remembered that, when hæmorrhage continues after the insertion of the tampon, it has merely been converted from frank bleeding into the far more dangerous concealed form. It should therefore be an invariable rule that the physician who takes upon himself the responsibility of the use of the tampon in placenta prævia, should never permit himself to leave the bedside during the time that it remains in place, since he alone is competent to detect the onset of a concealed hæmorrhage. The signs of hæmorrhage behind the tampon are of course identical with those of the classical concealed accidental hæmorrhage.[1]

When the tampon is used for this purpose, a speculum should be inserted into the vagina,[2] the whole vagina should be thoroughly disinfected, and distended from the fornix to the introitus by passing within it the largest number of pledgets of cotton which can be introduced under the use of such pressure as is judged to be advisable. The material of the tampon should have been previously rendered aseptic; it should be retained *in situ* by a vulvar pad or a T bandage, and should never be left in position more than four hours. At the end of that time it should be removed, and the size of the os determined by vaginal examination. As soon as dilation is sufficiently advanced to afford a probability that the engagement of the head will follow upon the rupture of the membranes, they should be torn. Should hæmorrhage occur behind the tampon, or if it is profuse from the start, it is generally best to abandon the conservative policy, and turn at once. The method should depend upon the amount of dilatation which has already been obtained; if the os is still small, bipolar version and subsequent control of the hæmorrhage by continuous gentle traction upon the legs is but little, if at all, more dangerous for the child, is distinctly safer for the mother, and, moreover, enables the operator to save the amount of blood which would be lost during the performance of a manual dilatation.

Low Insertion of the Placenta.—Insertion of the placenta into the dangerous zone is to be treated upon the principles which apply to marginal placenta prævia.

Central Insertions.—In central implantation of the placenta, the hæmorrhage is usually profuse at an early period of labor. If the os is soft, the best method of treatment is manual dilation of the os, after a preliminary partial separation of the placenta, and version. For the sake of the child, the dilatation should be carried to the fullest degree possible, the internal podalic method should be used, and the child immediately extracted; since even a preliminary separation is here likely to diminish the area of efficient placental surface so greatly as to render its death by asphyxiation almost certain. When the process of dilatation is attended by such extreme hæmorrhage as to seriously threaten the life of the mother, the interests of the child become secondary. Two fingers should then be forced through the substance of the placenta, and the child turned by the bipolar method, when traction upon the leg will usually at once control the hæmorrhage. Under these circumtances, however, the extraction should be made as rapid as is consistent with the integrity of the maternal tissues, since slow extraction is then necessarily followed by fœtal death.

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[1] See page 277.

[2] Sims' speculum in the left latero-prone position is greatly preferable.

When in central implantation the cervix is so rigid that its dilatation promises to occupy an extremely long time, and would offer an insuperable obstacle to immediate delivery, in the event of the occurrence of fresh hæmorrhage during the operation, the treatment depends upon the amount of blood which has been lost, and the severity of the hæmorrhage which is going on. When the mother is in good condition, and the hæmorrhage at the moment is slight, the placenta should be separated as far as possible with the finger, and the vagina tamponed, in the hope that the cervix may become sufficiently softened to permit of rapid dilatation before serious hæmorrhage occurs. By this plan, the interests of the child are of course subordinated to those of the mother; and when it is adopted, a large proportion of stillborn children must be expected.

When a rigid os which refuses to admit the finger, and a central implantation of the placenta, are accompanied by profuse flooding which is not arrested by preliminary separation of the placenta, no resource is left other than forcible dilatation of the os, with or without incision of its edges, to a degree sufficient to permit the performance of bipolar version.

Ether.—In placenta prævia, as in the other forms of antepartum hæmorrhage, the use of ether is not contra-indicated by previous loss of blood to any degree short of collapse and unconsciousness; its effect upon the pulse and general condition being invariably favorable, provided that it is given carefully and in moderate quantity.

After delivery, the uterus should be carefully watched, not only to guard against immediate post-partum loss of blood, but also because the liability to secondary hæmorrhage is likewise increased in cases of placenta prævia; and if the patient be appreciably collapsed from loss of blood, the usual treatment for this condition should be at once and persistently applied.

Concealed Accidental Hæmorrhage.

The detachment of a normally situated placenta in such a way that the resulting hæmorrhage is retained within the uterus is known by the name of concealed accidental hæmorrhage, and is the most dangerous form of obstetric bleeding, both because it is often overlooked or misunderstood by the attendant, and because the pressure of the blood effused behind the placenta tends constantly to increase the original detachment, which in its turn still further increases the hæmorrhage, and so forms a vicious circle that usually results in the loss of an enormous, and frequently of a fatal amount of blood.

ETIOLOGY.—It may arise (*a*) from a central separation of the placenta, and confinement of the effused blood between the placenta and uterine wall, its edges remaining firmly attached; (*b*) from separation of the upper edge of the placenta and confinement of the blood between the membranes and fundus; (*c*) from separation of either edge of the placenta, accompanied by rupture of the neighboring membranes and discharge of the blood into the amniotic cavity; and (*d*) from separation of the margin of the placenta, when the presenting part plugs the lower uterine segment so thoroughly as to prevent any external escape of blood: but in either of the last two cases it may be accompanied by a slight external leakage of blood or serum, though in a quantity insufficient to account for the symptoms.

These separations are usually due to irregular or partial contractions of the uterus, to blows which fall directly against the seat of the placenta, or to other external violence, but they may occur without any assignable cause.

PROGNOSIS.—Goodell's famous collection of 106 reported cases gave a death-rate of 51% for the mothers and 94% for the children; but since most of these occurred at a period when but little was known of this affection, it is probable that the extremely high maternal and fœtal death-rate was largely due to non-recognition of the condition—a failure which has been much less likely to occur since the publication of his article, to which most of our knowledge on the subject is due.

DIAGNOSIS.—The diagnosis is ordinarily easy; and failure to make it must usually be due to the fact that the rarity of the condition makes it unlikely to occur to the minds of practitioners not specially interested in obstetrics. Its recognition must rest on a sudden appearance of the ordinary symptoms of collapse from hæmorrhage, *i.e.*, pallor; shortness of breath; a demand that the windows be opened, or a request to be fanned; uneasy, restless, or tossing movements in the bed, technically known as jactitation; a sense of dizziness; a feebleness of vision, or even darkness of the whole room to the patient's sight; and a progressively feeble and rapid pulse.

When these symptoms occur suddenly and increase rapidly, without being accounted for by visible hæmorrhage, they should at once excite a suspicion of the existence of the concealed form; when the special symptoms of the condition should be searched for. The uterine contractions become steadily weaker, and the intermittent uterine pains are succeeded by a tonic rigidity, accompanied by an agonizing sense of distention which is not infrequently evidenced by the constantly repeated remark, "I shall burst." The abdomen meantime increases in girth from rapid distention of the uterus by the effused blood; the fœtal heart becomes weak, distant, and irregular.

In cases of central separation an auxiliary tumor, due to accumulation of blood behind the placenta, is sometimes to be felt on one side of the uterus; in the intra-membranous variety liquor amnii tinged with blood may be seen to leak away; and when the hæmorrhage is confined only by the pressure of the presenting part there may be slight external hæmorrhage.

The onset of the attack is sudden and its progress is rapid; the clinical picture is striking, and when once seen is thereafter unmistakable. The loss of blood is ordinarily so great that the whole duration of the attack is brief, and, if mother or child are to be saved, the appropriate treatment must be adopted without the loss of a minute.

TREATMENT.—The intra-uterine tension is always great, but is in itself insufficient to restrain the hæmorrhage, since fresh blood is poured forth during each interval of relaxation, while the periods of arrest of hæmorrhage by the active contractions of the uterus become progressively shorter and shorter as the muscular fibres are over-tired and paralyzed, by their rapid distention; so that in this, as in all other forms of uterine hæmorrhage, the one hope of closing the open mouths of the vessels lies in an immediate emptying of the uterus, in order to afford an opportunity for complete contraction and retraction to occur.

If, as is uncommon, the head is in the cavity at the time the hæmorrhage occurs, an application of the forceps, and the most rapid extraction possible, is the proper operation; but in the majority of cases the separation either takes place during pregnancy and before the onset of labor, or else while the head is still free above the brim and the os but slightly dilated, and manual dilatation followed by version is then ordinarily the preferable operation.

The dilatation should be as rapid as possible, it being justifiable in so extremely grave an emergency to take somewhat greater risks of laceration than would be ordinarily permissible. So soon as full dilatation has been obtained, the membranes should be ruptured, a foot seized, and version and extraction performed, with the utmost speed that the safety of the maternal tissues permits.

The substitution of high forceps for version, on the ground of preventing still greater hæmorrhage by maintaining a but little diminished uterine tension until the moment of delivery, has been advocated by some operators, but is disapproved of by Goodell, and seems irrational, from the fact that retraction arrests the hæmorrhage, and that in untreated cases the bleeding continues so long as the woman lives, in spite of the enormous pressure.

If, in the introduction of the hand for version, the effused blood is set free, the quantity which escapes from the vulva, and the force with which it is expelled, is extremely disconcerting and alarming; but it must be remembered that this blood has been already lost from the circulation; and that the retraction of the uterus, which will surely follow its evacuation, will more than compensate for the accompanying loss of intra-uterine tension.

During the extraction of the child, light friction should be constantly applied to the fundus of the uterus, and every precaution taken against the occurrence of further or post-partum hæmorrhage.

Post-Partum Hæmorrhage.

Some slight loss of blood during the third stage and immediately after its termination is so frequently observed as to be almost normal; and post-partum hæmorrhage can only be defined as an exaggeration of this normal phenomenon to an excessive degree; that is, to an extent which results in markedly increased frequency, and decreased force, of the patient's pulse. In practice, the condition of the average patient is seldom much affected by a loss of less than ten to twelve ounces, so that the rule may be stated, that a loss of less than eight ounces may be regarded as a trifling incident in the case.

True post-partum hæmorrhage consists in the loss of blood from the utero-placental site, but it is convenient to describe in addition, under this head, the bleeding from torn vessels in the soft parts which occasionally occurs immediately after delivery. The treatment of these two forms of hæmorrhage is radically different, and the differential diagnosis between them must be made by observation of the condition of the uterus and of the character of the effused blood. Hæmorrhage which is due to laceration is seldom profuse, and is composed almost wholly of red arterial blood. True post-partum hæmorrhage may be either profuse or gradual, and is composed of mixed arterial and venous blood; the latter predominating and giving to the mixture a much darker or more purple color; and finally, and most important, true post-partum hæmorrhage can occur only when the uterus is relaxed and flabby, and ceases during active contractions of the organ, which have, however, little or no effect upon loss of blood from ruptured arteries in the cervix or vagina. If, then, hæmorrhage starts in the presence of a wholly retracted and firm uterus, *i.e.*, a uterus which is felt by external palpation as a small, firm, spherical body behind the symphysis pubis, or if the occurrence of such a contraction fails to arrest the loss of blood, the vagina and cervix should be subjected to a careful ocular inspection in order to discover or exclude the presence of spurting arteries in the lacerated portions of either.

HÆMORRHAGE FROM LACERATION: *Diagnosis.*—The examination should be made with the best light attainable, and through a large bivalve speculum if such an instrument is at hand; but if, as may often happen at the moment of an emergency, no regular speculum can be obtained, the patient should be placed in the lithotomy position, and the vagina exposed by the use of four retractors bent to an acute angle and held by assistants, two of which should retract the lateral walls, while the other two are applied respectively to the anterior and posterior portions of the passage. If no better material offers, these may be improvised by bending the handles of four of the largest spoons which can be obtained, to the appropriate angle; a contrivance which, by a little ingenuity, may be made to offer a surprisingly good view of the whole vagina and cervix. Sims' position and the use of Sims' speculum should be carefully avoided with recently delivered patients, since the negative pressure in the abdominal cavity, which is characteristic of this attitude, may easily cause distention of the flabby uterus, and be followed by instant death, from the admission of air into the gaping mouths of the uterine sinuses at the placental site.

Abundant as is the blood supply of the recently parturient vagina, its vessels are individually so small that hæmorrhage sufficient to cause alarm rarely follows even the most extensive lacerations of this portion of the genital canal, but sufficiently deep cervical tears may occasionally cause a laceration of the circular artery of the cervix, a vessel which is in most cases sufficiently large to be the cause of distinctly serious hæmorrhage.

Treatment.—The only appropriate treatment of loss of blood from either form of tear is the immediate repair of the laceration by properly placed sutures. These will be inserted most easily by a fully curved needle held at right angles to the shank of a proper needle-holder, two instruments which should form a portion of every obstetrician's outfit; but if the physician has neglected to provide himself with them, or is timid about undertaking the immediate repair of a deeply lacerated cervix in the face of an existing hæmorrhage, and perhaps with an insufficient light and almost useless assistants, the bleeding may be readily controlled by the passage of any form of needle backward and forward through the edge of the tear in such a way that the spurting artery is entirely enclosed within the suture after its ends have been tied (Fig. 79). In most cases the cervix can be seized by the fingers and drawn sufficiently near the vulva to permit the insertion of such a suture without the aid of the needle holder.

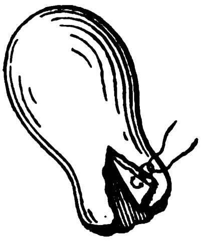

FIG. 79.—SUTURE OF A BLEEDING VESSEL IN THE CERVIX.

TRUE POST-PARTUM HÆMORRHAGE.—This much more common phenomenon is due to failure of the normal mechanism for its prevention; and a thorough comprehension of this process is so essential to the rational treatment of all forms of true uterine hæmorrhage that its discussion is a necessary preliminary to any clear and intelligent description of the treatment which should be employed.

The separation of the placenta from its uterine attachments necessarily leaves the mouths of the uterine vessels in a patent condition, a fact which would always provoke profuse hæmorrhage if this were not prevented under normal circumstances by the fact that the uterine contractions which follow its detachment, drive it into the vagina, when its expulsion leaves the uterus free to retract upon itself; in which condition the vessels are closed by collapse of their thin walls under the pressure of the muscular fibres which surround them, during the reduction of the area of the placental site which is consequent upon retraction (Figs. 80 and 81). If, however, this retraction fails or, after it has once occurred, is lost from any cause, the uterine vessels remain dilated, and, with their orifices no longer occluded by placental

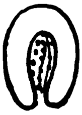

FIG. 80.—CLOSURE OF THE SINUSES IN A RETRACTED UTERUS.

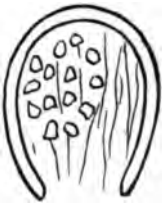

FIG. 81.—PATULOUS CONDITION OF THE SINUSES IN A RELAXED UTERUS.

tissue, are in a position eminently well suited for the production of hæmorrhage (Fig. 81). It follows necessarily, as a corollary to this explanation, that the natural, and only legitimate, method of arresting post-partum hæmorrhage, is by securing prompt contraction and retraction in an empty uterus.

TREATMENT.—PROPHYLAXIS.—In the discussion of post-partum hæmorrhage, too much emphasis cannot be laid on the importance of the rôle which prophylaxis plays in this connection; indeed, it may be safely said that, in the most careful and experienced hands, post-partum hæmorrhage in normal labor is an almost unknown occurrence, and that, if placenta prævia, deep and prolonged surgical anæsthesia, previous extreme distention of the uterus, and severe collapse of the patient from antecedent causes be excluded, post-partum hæmorrhage can in most cases be traced to some neglect of precaution by the professional attendants.

It is proper and it is the habitual custom of careful men to place by the bedside in every case of labor, as the period of delivery approaches, all the articles which are necessary for the treatment of hæmorrhage if it should occur. These are: a quantity of pieces of ice about the size of a hen's egg, brandy and ether, Monsel's solution of iron, ergot, and the hypodermic syringe, a pitcher of hot water, and a Davidson's or fountain syringe. From the moment that the head distends the perinæum. the hand of an assistant should be placed upon the fundus uteri, and should practise gentle friction upon it from that time until after the delivery of the placenta, and until the empty uterus has been contracted firmly and without marked relaxation, for at least ten minutes. The physician should, moreover, be careful, in the interest of the prevention of hæmorrhage, to avoid a too rapid extraction of the child in the absence of indications for hurry; indeed, the short time which may be occupied after the delivery of the head, in feeling for the cord about the neck, wiping the eyes, and clearing the fauces of the child, is distinctly advantageous as affording the uterus an opportunity for the retraction rendered necessary by the escape of the head. After delivery, under normal circumstances, the child should be given into the care of a bystander, and the hand of the physician or of a trained assistant should keep a careful watch of the fundus of the uterus through the abdominal wall, that he may be enabled to observe the first signs of relaxation. These, when noted, should be at once combated by the performance of gentle but rapid, circular friction of the uterus with the tips of the fingers, which should pass quickly across the anterior surface and, by infolding of the abdominal wall, around the fundus. If this motion is not followed by immediate hardening of the uterine body, a piece of ice should be applied to the abdomen and rubbed briskly about over the uterus; while if any suspicion of possible distention of the bladder is excited either by the history or by abdominal palpation, this should be at once relieved by the catheter, since a distended bladder may in itself prevent an adequate retraction of the uterus. The efficiency of ergot in producing tonic retraction of the recently delivered uterus is undoubted, and, since its use is productive of no possible harm, it is the usual custom, and the author believes should be the habit of all obstetricians, to administer to the patient a teaspoonful of the fluid extract immediately after the birth of the placenta. This is to be recommended as a routine procedure, because the action of ergot is too slow to render it of value if its administration is delayed until after the occurrence of hæmorrhage, unless it is given hypodermically; a procedure which it is wise to avoid, in view of the fact that the hypodermic use of ergot is not infrequently followed by subcutaneous abscesses. If it is so used, it should always be injected deeply into the substance of the thigh, as this method decidedly diminishes the risk of subsequent suppuration. The use of ergot by the mouth is occasionally followed by nausea, which is, however, rare if no more than a drachm of the fluid extract is given in about two ounces of cool water. All these precautions should be redoubled whenever there is any special reason to fear post-partum hæmorrhage.

ARREST OF HÆMORRHAGE.—*Emptying the Uterus.*—If from neglect of prophylaxis or other cause, post-partum hæmorrhage occurs, the chief end of treatment is to secure retraction—an end which is, however, attainable by many different means, which are here given in the order of their convenience and efficiency: emptying the uterus, massage, ice, hot water, astringent solutions, electricity.

The first essential in every case is the complete emptying of the uterus; that is, if hæmorrhage occurs before the expulsion of the placenta, it should be immediately extracted—if possible by the use of Credé's method of expression; but if this is not promptly successful, by the introduction of the hand. If the afterbirth has been already removed and an examination of the membranes shows them to be entire, the uterus may still have become distended by clotted blood, which may usually be expressed after the manner of Credé, but, if not, must be removed manually.

Massage of the Uterus.—The uterus being empty, there are many methods of securing and maintaining retraction, but the one first to be described possesses the advantage of efficiency in almost every case and of requiring no apparatus other than the hands of the operator. It is known under the name of bimanual massage of the uterus, and is performed by the insertion of one hand into the vagina and its passage in the extended position and with the palmar surface directed forward, into the posterior fornix of the vagina, while the other hand is applied to the fundus externally and crowds the uterus down into the pelvis in order to permit the internal fingers to have the freeëst possible access to its posterior wall (Fig. 82). The uterus is then briskly, but not roughly rubbed between the two hands, which maintain throughout the process gentle pressure toward each other. This manœuvre tends to control hæmorrhage in two ways: first, by the direct pressure of the hands, which holds the walls of the uterus together, over at least a portion of the organ; secondly, and of more importance, by a stimulation of the uterine muscle, which is partly due to direct irritation of the muscular fibres, but is in all probability more directly produced by a mechanical irritation of the large sympathetic ganglia which are found along the posterior walls of the parturient uterus.

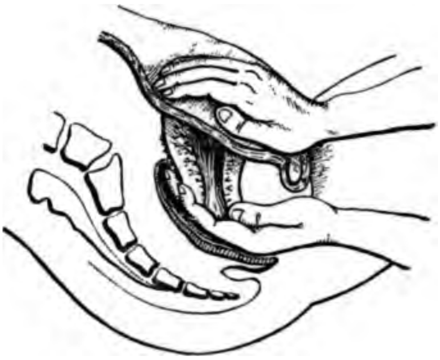

FIG. 82.—BIMANUAL MASSAGE OF THE UTERUS.

When the uterus has become contracted, this condition may usually be maintained by holding a piece of ice against the abdominal wall, in the region over the fundus. In very slight hæmorrhages, this expedient alone is often all the treatment that is required.

Intra-uterine Applications.—If this manœuvre is not promptly successful, it is usually best to pass rapidly to some other, since while some cases are favorably affected by this method of treatment, others yield more readily to different plans. Without withdrawing the internal hand from the vagina, it may again be passed rapidly into the uterus and immediately used, not only to empty the cavity of any clots which may have accumulated within it, but to promote contraction by the presence within the organ of a moving foreign body. If even this is not efficient, a piece of ice may be placed within the cavity, when the muscular fibres usually show their resentment of its presence by a contraction which expels it from the os; but this intra-uterine use of ice should not be too prolonged, on account of its evil effect in lowering the temperature, and increasing the shock which is already present as a consequence of the loss of blood.

For this reason, if the ice is not promptly expelled, it should be withdrawn by the hand, and followed by an intra-uterine injection of boiled water, or a 1:5,000 corrosive-sublimate solution, at a temperature of about 110-115° F., *i.e.*, at that which is distinctly but not uncomfortably hot to the hand; the injection being given under the usual precautions against the admission of air to the uterine cavity. The injection of hot water is not only valuable from its ordinary effect in causing contraction of the vessels, but more especially from the stimulation of the muscle which results from the sudden change from the temperature of ice to that of the injected fluid.

During the intervals which necessarily occur in the substitution of ice for hot water, or vice versa, bimanual friction should be carefully kept up. These measures, if promptly carried out, seldom fail; but in such an event, the main resource at our disposal is the intra-uterine injection of an astringent solution, of which a 1 to 100 watery solution of the officinal acetic acid is decidedly the best, or if this is not at hand a mixture of ordinary corrosive-sublimate solution with sufficient vinegar to impart a distinctly brownish tinge to the fluid.

Styptics.—If this method fails, and hæmorrhage continues until the patient is in imminent risk of an immediate and severe collapse, the uterus should be again cleared of clots and a ball of absorbent cotton or piece of clean cloth, saturated with the tincture of iodine, preferably Churchill's, or with Monsel's solution diluted with four times its quantity of water, should be passed into the uterine cavity; the advantage of iodine over the iron solution being its more stimulating character, and the lesser liability of causing an extensive thrombosis formation and a consequently increased danger of septic infection.

Faradism.—If a Faradic battery be at hand, its use, either by placing both electrodes on the abdominal wall, or by the passage of one within the uterus while the other is applied to the abdomen, may produce efficient contractions.

As an addition to these measures, time may often be gained by compression of the aorta against the lumbar vertebræ, by deep external pressure with the hand through the abdominal wall, the situation of the vessels to the left of the spinal column being borne in mind. The subcutaneous administration of brandy or sulphuric ether, though contra-indicated during the continuance of most forms of hæmorrhage, is to be earnestly recommended in post-partum or other uterine bleeding, since the increased loss of blood due to the stimulation of the heart which undoubtedly follows upon their use is far more than counterbalanced by their effect in promoting contraction of the uterus by stimulation of its muscular tissues.

After the cessation of hæmorrhage, the uterus should be carefully watched by the hand for at least an hour, or until it has been firmly contracted without intermission for at least thirty minutes, both because the weakened state of the system renders a second relaxation by no means improbable, and because a loss of blood which under ordinary circumstances would be unimportant may here be a matter of the utmost gravity; and so soon as it is judged expedient to dispense with this manual control of the fundus a firm and carefully adjusted binder should be at once applied. If the thickness of the abdominal wall is so great as to prevent satisfactory pressure of the binder upon the uterus, this may be obtained by inserting under the bandage a number of folded towels, which should be so adjusted as to completely surround the uterus; or, better yet, a rubber bag partly filled with water, which readily adjusts itself to the conformation of the subjacent tissues; and in the absence of this appliance, its place may be supplied by a bag of cloth loosely filled with moistened meal or sand.

TREATMENT OF COLLAPSE FROM HÆMORRHAGE.—If the hæmorrhage has been at all serious, the patient is left in a condition of collapse—that is, of cerebral anæmia—which may require constant and close care for many hours or days. In order to encourage the intra-cranial circulation, the foot of the bed should be raised by blocks, and in extreme cases the patient's legs should be held in position above the bed by means of pillows. She should be warmly covered, and the body heat should be carefully maintained by a free supply of artificial warmth, which is most conveniently furnished by filling bottles with hot water, and placing them under the bedclothes in close proximity to the patient; but care should be taken that the bottles are tightly corked, and that they are sufficiently well wrapped with flannel to prevent burning of the skin.

Free circulation of good air throughout the room should be carefully provided for, the need of oxygen being urgent. Stimulants should be given freely; at first, by hypodermic injections, repeated three or four times in order to insure the administration of perhaps two drachms, and later by the mouth or rectum.

If the patient has not been anæsthetized, a half-drachm of ether under the skin often acts excellently, but this should not be repeated more than once. The tincture of digitalis, and morphia by hypodermic injection, are also stimulants of great value in the treatment of collapse. In extreme cases an intra-venous injection of fifteen to thirty minims of the officinal solution of ammonia, diluted with an equal quantity of water, often causes prompt reaction.

Transfusion.—The process of transfusion of blood involves so many risks, and its technique is so extremely difficult that, though formerly recommended, it is now but seldom used; a better procedure being the intra-venous injection of a normal salt solution, made by dissolving fifteen grains of bicarbonate of soda and a drachm and a half of common salt in a quart of water, at a temperature of 100° F.; this should then be carefully filtered, and placed in a clean vessel. A superficial vein should be exposed, or, if the patient is so extremely anæmic that the veins cannot easily be found, the radial artery should be laid bare. The vein or artery should be nicked and the point of a fine canula passed within it, toward the heart in the case of the vein, or away from it if the artery is used. To the canula should be attached a rubber tube and funnel, and, the latter being held at an elevation of two or three feet above the vein, the whole quart of salt solution should be slowly poured into the system, a careful watch being kept on the pulse in the mean time; the object of the injection being to provide a sufficient quantity of fluid to enable the heart to work to advantage, until the tissues can replace the blood which has been lost. The process is not always successful, but has frequently been attended by most surprisingly favorable results.

AFTER-CARE.—The after-treatment of these cases should consist of absolute rest, deprivation of society, and the frequent administration of small quantities of food and stimulants, the best preparation being usually egg-nogg of the following proportions; two eggs should be broken into a cup, well mixed but not beaten up, and strained through a coarse colander; to this should be added enough milk to fill the tumbler, and to the mixture from half an ounce to an ounce of brandy. It should then be given to the patient, in quantities of not more than one-half ounce at a time, every few minutes.

In the winter, if fresh oysters can be obtained, their administration to the patient, raw, may be an efficient and agreeable alternative for this diet. No limit can be placed on the quantity of nutriment which may properly be given to a collapsed patient, the rule being that the largest amount that the patient can be induced to swallow will be the most beneficial.

The author has known such a patient to absorb in twenty-four hours sixty eggs and three quarts of milk, and then make a surprisingly rapid recovery, the same diet in smaller quantities being continued for many days; and has seen another case, one of hydatidiform mole, in which, after an extremely severe hæmorrhage, a small and delicate woman took, in addition to considerable quantities of milk and egg, ninety-six dozen oysters in twelve days. This patient also made a good recovery.

CHAPTER XX.

ACCIDENTS OF LABOR.

PRESENTATION AND PROLAPSE OF THE FUNIS.

PRESENTATION of the funis is the descent of the cord in advance of the presenting part and behind the intact membranes. Prolapse of the funis is its entrance into the vagina in advance of the presenting part, after the membranes have ruptured. The accident is favored by implantation of the placenta on the lower uterine segment, unusually long cords, the insertio velamentosa, abnormal presentations, hydramnion, multiple pregnancies, and contracted pelvis.

The diagnosis of the condition is easy, since no other intrauterine body resembles the cord, even though it be pulseless, and because no other pulsating body can appear at the os.

The prognosis for the mother is not altered by the descent of the funis, but the prospects for the child are extremely bad; more than one-half being lost by compression of the cord and consequent asphyxia, of which there is far more danger in head presentations than in any others.

PRESENTATIONS OF THE FUNIS.—*Treatment.*—If the cord when discovered is already pulseless, the fœtal heart should be at once auscultated; and if this is not heard, an attempt at replacement of the cord should be made: if this fails, nothing more should be done, the case should be left to nature, and the family informed that the child is dead. If the heart be heard, the presenting part should be immediately raised by upward pressure until pulsation is felt to return in the cord, and carefully retained in its new position until the regularity of the heart-beat is well established before any further treatment is undertaken.

The subsequent management of the case must depend upon the degree of dilatation present. In case the os is rigid and but slightly dilated, the patient should be placed in the knee-chest position, in the hope that the influence of gravity may induce sufficient recession of the presenting part to allow of the replacement of the cord under the influence of its own weight. This position should be maintained as long as the strength of the patient permits, and may be aided, if inefficient in itself, by gentle attempts at replacement of the cord with the fingers; but in such circumstances the greatest care should be maintained to avoid rupturing the membranes. In case this attempt at replacement fails, the immediate performance of external or bipolar version is to be advised, unless the shape of the pelvis or some other condition of the case contra-indicates version. This manœuvre almost invariably causes the return of the cord, and, moreover, in case of failure in this respect, leaves the child in a situation which is especially favorable to rapid extraction should that be subsequently necessary.

If the os is well dilated when the accident is discovered, postural treatment is to be recommended when the pulsations ot the cord are undisturbed; but if they have once been arrested, a larger number of children will probably be saved by immediate version, which is here rendered permissible by the existence of dilatation.

In the version the head should be made to move away from the side on which the cord has descended, in order to avoid a fresh compression during the operation. The cord usually disappears as the child turns; but for the sake of safety, the patient should be placed upon the side, with the hips somewhat elevated by a pillow, as soon as the operation is completed, in order to favor retention of the cord, and should maintain that position until the membranes rupture or the breech engages.

If version is contra-indicated, a conservative policy is to be advised, in the hope that its pulsations may persist until the cervix has become sufficiently dilated to admit of immediate delivery. The patient should, however, be kept in the latero-prone position and carefully watched during the interval, and frequent if not constant vaginal examination should be maintained in order to detect injurious pressure upon the funis so soon as it occurs. This plan of delay is, however, much less favorable to the child, since, if the membranes rupture while the cord is still presenting, it at once descends into the vagina, and in head presentations its circulation is often promptly stopped by the descent of the presenting part which usually follows a partial escape of the waters.

PROLAPSE OF THE FUNIS.—*Treatment.*—When the cord has once prolapsed, even though its pulsation be as yet unstopped, no delay should be permitted. The only treatment which is then permissible is either immediate reposition of the cord, or version and rapid extraction; and the choice between these procedures must depend upon the circumstances of the individual case.

If the pulsations are regular and strong, and if the os is so small that extraction would be impossible unless it were preceded by manual dilatation, an attempt at reposition should be made, since the time which must be spent in dilatation would seriously compromise the chance of obtaining a living child.

The patient in such a case should be placed in the knee-chest position, and the head should be made to recede from the superior strait by pressure with the fingers, which should then, if possible, return the cord through the os, and, if successful in this, should urge it entirely beyond the head into the sulcus around the neck. If this attempt succeeds, the patient should turn upon her side and every effort should be made to secure an immediate engagement of the head. The uterus should be excited to contraction by manual friction upon the fundus, and suprapubic pressure should be exerted upon the head through the abdominal walls. In most cases, however, digital reposition fails, and in such cases an attempt should be made to replace the prolapsed portion of the funis by instrumental means.

Several forms of repositor have been devised especially for this purpose, but no one of them is superior to that which can be extemporized from an ordinary English-webbing catheter, which, moreover, possesses the advantage of being always at hand. The catheter should be prepared for this use by softening it in warm water until the stilette can be made to emerge from the eye; a loop of disinfected string or narrow bobbin should then be passed between the point of the catheter and the stilette, and the latter should be withdrawn until its tip again enters the lumen of the instrument, when the loop is permanently attached to the eye or the bobbin may be threaded through the catheter as in Fig. 83.

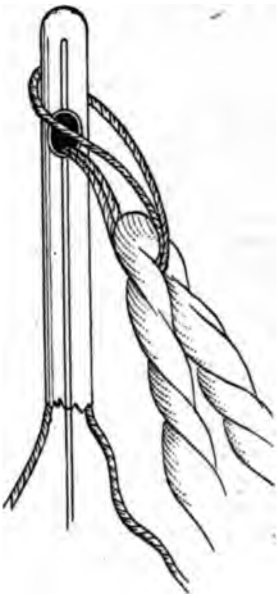

FIG. 83.—USE OF THE CATHETER AS A FUNIS REPOSITOR.

The lowest portion of the prolapsed cord should be made to engage in the loop, and should then be returned through the os to the uterus, and as far toward the fundus as the length of the catheter permits. The stilette should then be withdrawn, in order to release the catheter from its position within the loop, lest this should of itself arrest the circulation. After the replacement is effected, the head should be made to engage as rapidly and firmly as possible, and the catheter should be left *in situ* until it is expelled with the child, lest its withdrawal should be followed by a recurrence of the prolapse.

After reposition by either method, the fœtal heart should be carefully watched until it is found to become steady and regular;

but if the first attempt at instrumental reposition is not successful or is followed by prolapse of other portions of the cord, it is better to abandon the hope of success by this method and to proceed at once to dilatation and version, since prolonged efforts at reposition almost invariably result in the birth of a stillborn child.

If, at the time the prolapse occurs, the os is almost wholly dilated or dilatable, it is better to etherize the patient without delay and deliver the child by version; unless, indeed, the prolapsed loop is extremely short, when an attempt at its reposition is admissible.

When compression has once occurred, reposition usually fails to save the child, and version is the better operation.

When a prolapse of the funis is complicated by the presence of a contracted pelvis, the treatment adopted should be determined by the type of deformity present, since version in the uniformly contracted pelves offers at best but little chance for the child.

In presentation of the breech and cord, the danger of compression of the cord is more remote than when the head presents, owing to the smaller size and softer consistency of the pelvic extremity. For this reason, if postural treatment fails, it is fairly safe to remain inactive until the os is sufficiently dilatated to permit a rapid extraction, provided that the pulsations of the presenting loop are carefully watched meantime. In breech presentations complicated by prolapse of the cord, immediate extraction is almost always necessary.

In face presentations the danger of compression is also comparatively small during the early stages of labor, but such cases should always be treated by version when complicated by prolapse of the cord, since the small size of the presenting part renders it unlikely to occlude the os to a degree sufficient to prevent recurrence of the prolapse after reposition.

In oblique and transverse presentations, the danger of compression is reduced to a minimum; and since such cases must always be treated by podalic version, the occurrence of a prolapsed cord does not alter the indications.

SHORT FUNIS.—Decrease in the length of the cord may be actual, or relative and due to practical shortening from the coiling of a really long cord around the neck or other portions of the body. In minor degrees of shortening, the difficulty occurs only after the birth of the presenting part, and is usually easily remedied by division of the cord, or by slipping it over the head or shoulders, or, in breech presentations, over the buttock. In the extreme degrees, the diagnosis is seldom made until after the extraction of the child, which is usually delivered by operative measures undertaken for the relief of failure of its heart, or for delay from cause unknown. The condition may result in laceration of the cord, separation of the placenta, or possibly in inversion of the uterus. The occurrence of the latter accident, though theoretically possible, has not been described, while the two former are by no means serious if they occur, as is usually the case, during the later stages of a rapid delivery.

SUDDEN DEATH OF THE MOTHER DURING AND AFTER LABOR.

The nervous system of a parturient or puerperal woman is so much more unstable than under ordinary conditions that syncope unconnected with hæmorrhage and due solely to sudden mental shocks, such as excessive fright or grief, is by no means unknown, and has occasionally proved fatal. It not infrequently occurs after the termination of labor, and is then probably due to a disturbance of the heart caused by the sudden decrease of intra-abdominal pressure; but when so caused, it is rarely productive of permanent harm.

The extreme muscular exertion of labor may be the cause of a sudden failure of a fatty or otherwise enfeebled heart—a failure which may sometimes be so extreme as to produce a fatal result. Rupture of the cardiac muscle, or of the aorta or spleen, when already affected by degenerative changes, has also been known to occur during sthenic labor.

The most common cause of sudden death at this period is, however, a cardiac or pulmonary embolism. This accident is probably always consecutive to pelvic thrombosis, and generally appears during the later portion of the puerperium and after the development of a milk-leg; it has, however, been known to follow a thrombosis of the pelvic veins of so slight an extent as to have been unrecognized before the occurrence of the accident, and many then happen early in the puerperium or during labor.

Another well-established cause of sudden death is the entrance of air into the uterine sinuses during or immediately after labor. During labor it may be caused by the passage of a catheter between the uterus and membranes. After labor it may be effected by the assumption of the knee-chest or latero-prone position immediately after delivery; since the uterus may then be so flaccid as to be capable of expansion under the negative intra-abdominal pressure, caused by non-support of the distended abdominal walls. For this reason a recently delivered patient should never be allowed to turn upon her face or side unless the abdomen is carefully supported by a firm bandage or the hand of an attendant.

TREATMENT.—When death occurs during the later months of pregnancy, or during the progress of labor, it is manifestly the duty of the obstetrician to make every attempt to save the life of the fœtus, that of the mother being already lost. If death is assured, no harm can be done to the mother, and, remembering that in calculating the duration of pregnancy a mistake of several weeks is not uncommon, and that children delivered at slightly less than seven months have undoubtedly been saved, it is right that the family should be urged to give the fœtus the benefit of the doubt in any case in which pregnancy is supposed to have advanced to six full calendar months.

If the cause of death is such that its occurrence can be anticipated, a consultation should be called so soon as the mother's death is considered to be certain within a few moments, and the child should be delivered by rapid manual dilatation and version, or, if the fœtal condition is such that the delay necessary for this operation seems likely to be fatal, by the performance of the Cæsarean section.[1] Such interference is, however, to be avoided in cases in which the recovery of the mother is in any way possible; since the dangers of abdominal section and the shock of a rapid delivery are almost necessarily fatal to her; and the means of distinguishing a real from an apparent death are so imperfect as to make the position of the obstetrician one of the greatest delicacy, since the symptoms of death usually relied on for medico-legal or other purposes all require a lapse of several hours after the central decease of the patient.

The diagnosis of the reality of the death is seldom difficult when it occurs during pregnancy as a result of an intercurrent fever or organic disease; but in cases of sudden collapse from heart failure or embolism during labor, it must depend mainly upon the absence of the heart-beat when examined by the stethoscope, in conjunction with the existence of symptoms which show sufficient cause for its occurrence; *i.e.*, the sudden appearance of extreme dyspnœa, accompanied by loss of consciousness and an irregularly tumultuous action of the heart, when followed by a cessation of its action which persists during several minutes of close observation, ought to be considered as sufficient evidence of cardiac failure or pulmonary embolism, and actual death.

CARDIAC DISEASE.—If a normal heart is auscultated during strong labor, it is usually found that the increased arterial pressure, which is caused by the sudden arrest of the enormously developed uterine circulation during the pains, produces murmurs with one or the other heart-sound, which cannot be distinguished from those which are the result of valvular lesions. In view of this fact, it would seem, *à priori*, that a heart which was the seat of serious valvular trouble could hardly be expected to preserve its activity under so severe a test. In point of fact, valvular lesions cause extreme suffering from dyspnœa during labor, but in the majority of cases produce no worse result.

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[1] Rapid extraction through the natural passages is usually fatal to any child which has not reached the eighth month of utero-gestation, and the preservation of a seven months' fœtus can hardly be hoped for by any lesser means than the Cæsarean section.

Labor in the presence of cardiac diseases is apt to be rapid, because the soft parts are usually resilient and lax. The woman should be permitted to retain the erect position until the moment of expulsion is close at hand; and in extreme cases, it may even be necessary to deliver her in a reclining position, with her shoulders propped up on pillows, and her buttocks projecting just beyond the edge of the bed. An assistant should stand on either side, and should prevent her from slipping on to the floor by each seizing a thigh in one hand and a foot in the other.

Labor should be expedited by every means that is possible. Ether is contra-indicated in the presence of even the slightest pulmonary complications, and in uncomplicated cardiac disease of extreme degree; in less severe cases, its use is seldom dangerous, provided it is skilfully given, and in the smallest possible quantity.

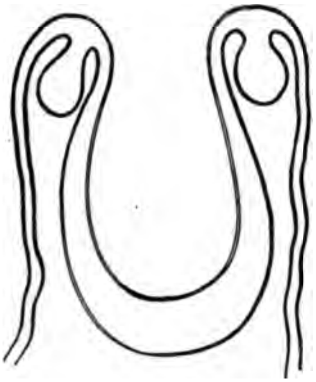

FIG. 84.—INVERSION OF THE UTERUS.

INVERSION OF THE UTERUS.

Inversion of the uterus has been described as a hernia of the body through the os, and the condition is very well characterized by Parvin in the expression "The uterus is upside down and wrong side out." It may be complete or partial (Fig. 84).

CAUSATION AND PROPHYLAXIS.—Inversion may occasionally be due to irregular, reversed uterine peristalsis, or may occur as the result of the general intra-abdominal pressure when exerted against the fundus of a relaxed uterus, but is usually caused by traction upon the cord, or by efforts at expression of the placenta when these are applied to the partially or wholly relaxed uterus. Its occurrence is to be prevented by the avoidance of expression during relaxation of the uterus, and by an adoption of the rule never to make traction upon the cord.

DIAGNOSIS.—The appearance of inversion is signalized by excessive pain, severe collapse, and sometimes hæmorrhage; the occurrence of the latter symptom being dependent upon the existence of complete or partial separation of the placenta. Inspection and bimanual examination will, at once establish the diagnosis.

TREATMENT.—The question of the advisability of the removal of the placenta from its site before the reduction of the inversion, has been variously answered. It is probably best to complete the detachment if separation sufficient to cause hæmorrhage has already taken place, but to return the uterus and placenta together, if they are still thoroughly adherent; since in the latter case any attempt at detachment of the secundines may cause a hæmorrhage, which cannot be arrested until after the return of the uterus.

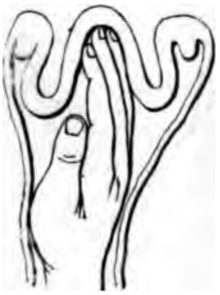

Fig. 85.—Reduction of an Inverted Uterus by Primary Return of the Fundus.

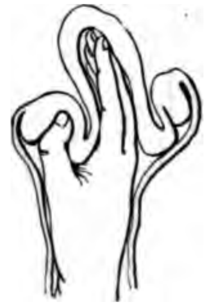

Fig. 86.—Lusk's Method of Reduction.

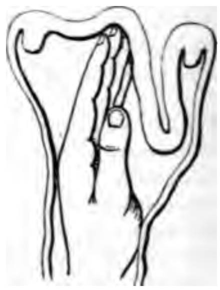

Fig. 87.—Noeggerath's Method of Reduction.

Replacement is to be effected by making pressure upon the fundus with a hand in the vagina, in opposition to the application of counter-pressure upon the cervix through the abdominal wall. Three methods may be employed: (*a*) The fundus may be received into the palm of the hand and an effort made to reduce the hernia by the return of the lower uterine segment first, and of the fundus later. (*b*) The hand may be formed into a cone and applied to the centre of the prolapsed organ (Figs. 85 and 86). (*c*) Or we may adopt the method described by Noeggerath, which consists in applying pressure to the region in which one or the other Fallopian tube enters the uterus; that is, in the primary reduction of one lateral half of the prolapse and the subsequent return of the other (Fig. 87). Counter-pressure on the cervix must be employed in either case. But whichever method is employed, it is essential that after the reduction the hand should be retained in position within the uterus until firm contraction has been excited, since the accident once produced has a distinct tendency to recur.

RUPTURE OF THE UTERUS AND OF THE UTERO-VAGINAL ATTACHMENTS.

Rupture of the body of the uterus may be produced during either natural or artificial delivery. Rupture of its vaginal attachments can only result from the use of undue force in the introduction of the hand for version or manual dilatation.

The uterus may be torn in a vertical direction, either through the cervix and lower segment, or at any portion of the body; it may also separate along any horizontal line, and this may subsequently extend at either end in a vertical direction; but the mechanism by which these two forms are produced is essentially different.

Vertical lacerations of the lower uterine segment may take place by the extension of cervical tears during rapid extraction of the child by forceps or during manual extraction of the aftercoming head. A too forcible passage of the hand, or of some part of the fœtus, through a constriction ring may also result in the production of a vertical laceration. Other lacerations of the body are usually due to neglected retraction rings; and their occurrence is in effect the necessary and ultimate result of excessive thinning of the lower uterine segment by retraction of the uterus when uncompensated by descent of the child.

The prevention of these ruptures is to be effected by the application of operative interference before marked exhaustion of the uterus has occurred, and by the avoidance of force, and the use of counter-pressure, during the elevation of the head in version.

Rupture of the uterus may or may not be attended by a considerable loss of blood, but is always accompanied by an extreme collapse. Its dangers are, primarily, immediate death from hæmorrhage or from simple collapse; and, secondly, a strong probability of the occurrence of a general peritonitis at the end of from twenty-four to forty-eight hours. A large proportion of the patients are lost.

TREATMENT.—The hæmorrhage may usually be lessened or controlled by securing firm contraction of the uterus. If it is profuse, the patient is usually lost before any other treatment can be applied; but if it is moderate but continuous, it may sometimes be arrested and the life of the patient saved by an immediate laparatomy and suture of the uterus. In the absence of hæmorrhage the treatment must depend upon the situation of the rent and the degree of antisepsis which has been previously observed.

If the antisepsis has been careful, and if the rent is low and situated upon the posterior wall so as to favor efficient drainage of the abdomen, a large proportion of cases may be expected to recover under conservative treatment. This should consist of a careful cleansing and disinfection of the parturient canal; the application of an occlusion dressing; the insertion of a drainage tube, if this is thought to be expedient; and the continued use of saline cathartics to a degree sufficient to produce as large a number of watery dejections as the strength of the patient permits, as a precaution against the peritonitis which, in greater or less degree, is almost certain to follow the accident.

If there is any doubt as to the thoroughness of the antisepsis observed during labor, or if the situation of the rent be such that thorough drainage cannot be expected, a laparatomy should be done, the abdominal cavity should be thoroughly washed out with some gallons of boiled water, the edges of the uterine wound pared, and sutured by the method of Sänger. The escape of the child or placenta into the abdominal cavity is a fact unfavorable to success by conservative methods; but that this factor is of less importance than the observance of antisepsis and the situation of the rent, is shown by a case reported by Dr. C. M. Green,[1] in which the placenta, the attached membranes, and a large amount of blood clot were removed from the upper portion of the abdomen in close proximity to the liver, and in which the patient made a rapid and complete recovery without laparatomy.

VESICO-VAGINAL FISTULÆ.

These lesions usually appear during the puerperium as the result of sloughing caused by the continued pressure of the head during an unduly prolonged second stage; and the repair is then a matter of gynæcology rather than of obstetrics. When they are produced by laceration of the tissues during operative delivery, they are usually complicated by rupture of the pubic synostosis; in which event the danger of suppuration makes the existence of every opportunity for drainage so important that it is far better to restrict the immediate treatment to the application of a firm bandage around the pelvis in preference to an operative closure of the rent; and this the more especially since spontaneous union is by no means unknown. In the very rare cases in which laceration of the vesico-vaginal septum occurs during labor, without rupture of the symphysis, the rent should be repaired immediately by interrupted sutures; but this must be done with the utmost nicety, and with all the precautions which are necessary to the secondary operation.

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[1] Transactions of the American Gynæcological Society, vol. xiii., 1888, page 209.

LACERATIONS OF THE CERVIX.

The immediate repair of cervical lacerations has been recommended by some authorities, and it may be well to bring together the angles of the wound when the laceration is so extensive as to reach the cervico-vaginal junction; but even then free drainage from the uterus is so important a factor in normal convalescence that complete repair is usually inadvisable; and in lacerations of less extent, it is so difficult to distinguish severe from slight tears during the relaxation of the cervix and lower segment which is usual after delivery, that conservatism seems the better policy.

LACERATIONS OF THE PERINÆUM.

Perineal lacerations are usually divided in accordance with their extent into three classes: lacerations of the first degree, or nicks, in which the fourchette alone is torn, without involvement of the muscles which unite in the perineal body and form the so-called pelvic diaphragm; lacerations of the second degree, or uncomplicated ruptures of the perinæum, including all tears which involve the fibres of the pelvic diaphragm but do not destroy the recto-vaginal septum; and lacerations of the third degree, those which invade the integrity of the sphincter ani, and divide the recto-vaginal septum to a greater or less extent.

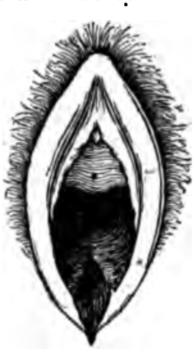

FIG. 88 *a*.

DIAGNOSIS.—CLASSIFICATION AND ANATOMY.—At the conclusion of labor, the finger should always be passed into the rectum and made to evert the posterior vaginal wall through the vulvar outlet, in order to insure the detection of any laceration which may have taken place. This examination is rendered necessary by the fact that a large

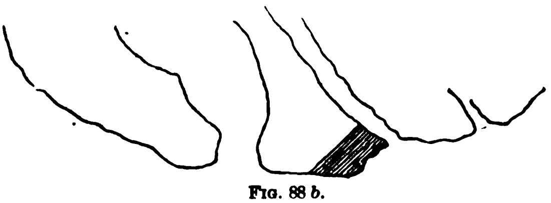

FIG. 88 *b*.

FIG. 88.—*a*, LACERATION OF THE FIRST DEGREE; *b*, DIAGRAMATIC ANTERO-POSTERIOR MEDIAN SECTION OF THE SAME.

number of the most important tears are entirely intra-vaginal, and are not likely to be recognized by simple inspection of the external parts. The bruised and congested appearance of the tissues immediately after labor occasionally makes it difficult to decide upon the existence or non-existence of a laceration, but the presence of a tear should usually be recognized by a careful search in a good light. If doubt be felt, the suspected surface should be lightly dried with a pledget of cotton, when if a tear be present it will be recognized by its rough, irregular surface.

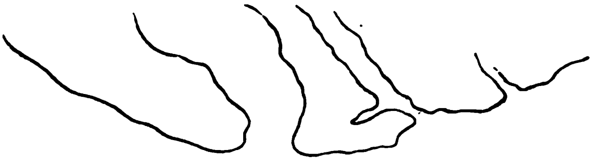

FIG. 89.—DIAGRAMMATIC ANTERO-POSTERIOR MEDIAN SECTION THROUGH A LACERATION OF THE SECOND DEGREE.

Lacerations of the first degree usually take the form of longitudinal divisions of the fourchette in the antero-posterior median plane of the body (Fig. 88).

The more usual forms of laceration of the second degree are: a tranverse tear immediately within the orifice of the vagina proper;

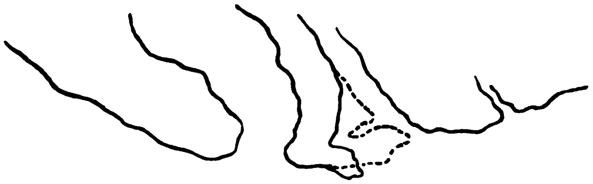

FIG. 90.—DIAGRAMMATIC SECTION SHOWING THE RETRACTION OF A LACERATION OF THE SECOND DEGREE.

and a combination of such a tear with longitudinal, lateral lacerations of the lateral walls, extending upward on one or both sides of the vagina.[1] The transverse lacerations probably occur during the outward and forward extension of the perinæum as it stretches over the advancing head, and are, in effect, a rupture of the fibrous attachments between the superficial structures and the levator ani. The lower shelf (Fig. 89) contains the superficial fascia and the intrinsic muscles of the perinæum; while the upper and remaining portion of the lacerated body is made up of the median attachments of the levator ani and other muscles, which form the pelvic diaphragm. After one of these lacerations has occurred, the habitual contraction of the muscles causes a retraction of the upper portion of the perinæal body to the position shown by the heavy line in Fig. 90, and results in the production of an irregular raw surface, which might easily be mistaken for a longitudinal tear, but which returns to its true form if its upper edge is seized in the median line, and drawn forward and downward. The simple transverse laceration is rarely seen alone, but is complicated in the majority of cases by the extension of one or both of its outer extremities upward along the vaginal walls; these lateral tears being caused by a splitting apart of the posterior and lateral portions of the levator ani in the direction of their length (Fig. 91). This form of tear is frequently combined with a median laceration of the lower shelf; in which case the retraction of the separated corners of the fourchette by the contractile force of the transversus perinæi and constrictor cunni muscles results in the production of an apparently crescentic tear such as is diagrammatically represented by Fig. 92.

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[1] See "The Relations between the Anatomy of the Lacerated Perinæum and the Mechanics of its Causation." Trans. Amer. Gynecol. Soc., vol. 26, 1891.

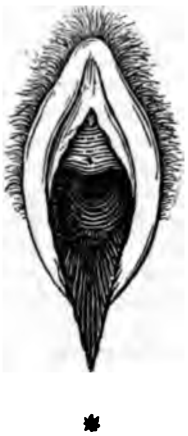

FIG. 91 *A*.

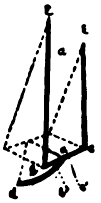

FIG. 91 *B*.

FIG. 90.—*A*, TYPICAL LACERATION OF THE SECOND DEGREE; *B*, DIAGRAMMATIC REPRESENTATION OF THE SAME; *b*, *c*, the transverse tear; *b*, *e*, and *c*, *e*, the lateral prolongations; *a*, *b*, the median tear of the lower shelf; the points *b′* and *c′* are lost by retraction.

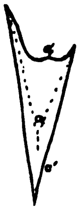

FIG. 92.—DIAGRAM OF A TEAR OF THE SECOND DEGREE AFTER RETRACTION. The dotted lines represent the situation of the tissues before retraction.

A complete laceration is practically a complication of the last form by a tear of the remaining portion of the recto-vaginal septum in the medium line through the sphincter ani. The appearance of the result is shown by Fig. 93.

TREATMENT.—As a general rule, all lacerations should be repaired by sutures as soon after the completion of labor as is convenient. Lacerations of the first degree should be so repaired, in order to lessen the area of denuded surface and so diminish the chance of septic absorption, even if the loss of support which may be caused by them is so trifling as to be unimportant. Those of the second degree should be sutured, not only for the same reason, but because their non-union entails in most cases subinvolution of the vagina, loss of support, and the whole train of symptoms which are so familiar to the gynæcologist as the result of rupture of the perinæum. Complete laceration must be repaired, not only for reasons of antisepsis and to prevent loss of support; but also on account of the disgusting condition of incontinence, which is the only possible result of their neglect.

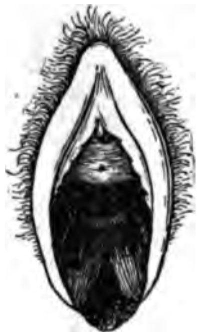

FIG. 93.—COMPLETE LACERATION OF THE PERINÆUM (IN THE THIRD DEGREE).

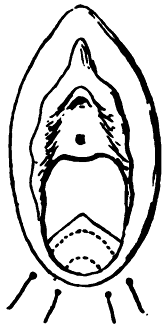

FIG. 94.—SUTURE OF A LACERATION OF THE FIRST DEGREE.

The lesser degrees of laceration can usually be satisfactorily repaired without the use of anæsthesia if the operation is done immediately after the completion of labor, when the distention and bruising of the tissues which is always incident to delivery renders them comparatively insensitive.

Patients in fair condition may usually be anæsthetized without special risk for the operation of repair of the perinæum; but if the condition of the patient is such that the prostration and risk of hæmorrhage, always incident to the administration of ether immediately after labor, render its administration inexpedient; or if the tissues are so far bruised or injured that it is thought best to allow them to recover their tone before attempting to bring them together, the operation may be done with equal success, under full surgical anæsthesia, at the expiration of from twelve to twenty-four hours, though some slight freshening of the surface with the curette is usually expedient then.

Methods of Repair.—Tears of the First Degree.—Mere nicks are best treated by the simple suture shown in Fig. 94, in which a large curved needle is made to enter the external skin about a quarter of an inch from the edge of the wound, and is passed through the tissues above the apex of the tear without appearing in the torn surface, to reappear at a corresponding point on the other side. The sutures should be about one-third of an inch apart, and more than two are never necessary.

Tears of the Second Degree.—The patient should be placed on her back, lying across the bed, and with her knees held by assistants. The vagina should be thoroughly syringed out with a corrosive-sublimate or creolin solution, and a large wad of absorbent material, wet with the same solution, should be placed in its upper portion to prevent the trickling of blood over the surface which is to be repaired, and thus afford to the physician a clearer view of the field of operation. The ragged and bruised edges of the wound should be carefully trimmed with scissors, and the surface thoroughly sponged and cleaned of all clots before the insertion of the sutures. The material used for sutures may be silver wire, silkworm gut, catgut, or silk, the choice being a matter of personal convenience rather than essential, and a medium size should be selected.

Small tears may be repaired by a large, full-curved needle, and most tears can be repaired, if necessary, by this means or by the use of a large, full-curved Peaslee needle; but the accurate adjustment of extensive lacerations requires the whole paraphernalia of the gynæcologist—a variety of needles, large and small, straight and curved, a good needle-holder, retractors, tenaculum, wire-twisters, etc.

If the patient is already anæsthetized, or if the administration of ether is not objected to, if a trained assistant is at hand, good light is attainable, and the physician is familiar with the operation, these tears are perhaps best repaired by one of the method recommended for the secondary operation. The vagina should be held open by lateral retractors, and the divided tissues should be drawn into place by tenacula, in order to enable the operator to observe exactly the position in which they should be brought together. The needle should then be introduced just outside the lower portion of the external tear and close to the median line, and passed up through the recto-vaginal septum, to emerge close to the upper border of the transverse tear at the same distance from the median line, its course being watched by the forefinger of the other hand, which is passed into the rectum for this purpose. The needle should be wholly withdrawn, reentered as nearly as possible at the point of emergence, carried through the tissues along a line parallel to the upper edge of the tear, and brought out through the external skin on the opposite side of the laceration. Similar sutures should be inserted alongside of the first, and the lateral wings of the tear should be repaired by parallel though shorter sutures, inserted at intervals of about one-third of an inch (Fig. 94). The wound should be carefully cleansed and the sutures tied or twisted, beginning with the outer sutures and working inward. After the completion of the operation, the twisted sutures will lie in the shape of a V upon the posterior vaginal wall, and will be entirely within the vulva unless the external shelf of the perinæum has also been lacerated, when a few superficial sutures must often be inserted through the skin of the perinæum (Fig. 96). The operation is most easily performed with long, straight, spear-pointed needles, and requires the use of a needle-holder.

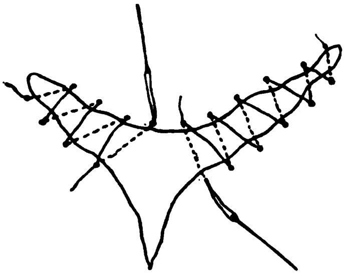

FIG. 95.—SUTURE OF A LACERATION OF THE SECOND DEGREE.

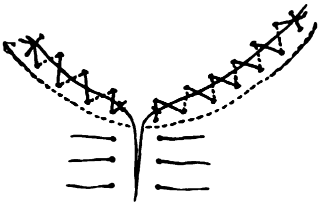

FIG. 96.—INSERTION OF THE EXTERNAL SUTURES IN A LACERATION OF THE THIRD DEGREE.

If circumstances render this operation inconvenient or impossible, almost equally good results may be obtained by a more ready method; and this operation, if done immediately after the conclusion of labor, can usually be performed without anæsthesia, from the greater rapidity with which the sutures can be introduced. A large, fully curved needle should be made to enter through the external skin a little in advance of the anus, and three-quarters of an inch from the median line; should be carried with a wide sweep entirely outside the tear, into the upper portion of the perinæal body, and made to emerge in a corresponding situation upon the other side. A second suture should be introduced at a point about a third of an inch anterior to the first, and at an equal distance from the median line, and should be swept upward in the same manner, and to the same height in the recto-vaginal septum; the whole course of each suture being watched by the rectal finger; a third, a fourth, and, if necessary, a fifth suture should be inserted in the same manner. The sutures should be buried throughout their course, *i.e.*, should not be seen in the wound; and if the lateral tears are so high or deep that portions of the sutures do appear in the wound, the extensions must be repaired by a second set of sutures placed within the vagina. When all the sutures are in position, those which are applied to the lateral extensions should be brought together first, from above downward, after which the external sutures should be tied from behind forward over a roll of gauze, care being taken to see that the wound is wholly free of clots when brought together (Fig. 97).

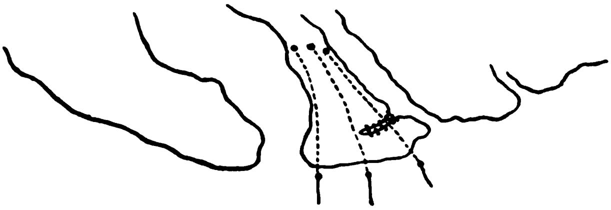

FIG. 97 *a.*

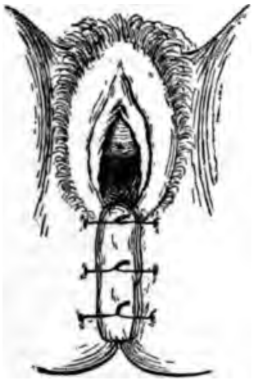

FIG. 97 *b.*

FIG. 97.—RAPID METHOD OF REPAIRING A LACERATION OF THE SECOND DEGREE. *a*, Section showing the position of the sutures; *b*, view after the sutures are tied.

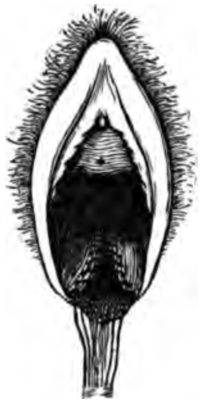

FIG. 98.—INSERTION OF THE RECTAL SUTURES IN A LACERATION OF THE THIRD DEGREE.

Lacerations of the Third Degree.—The condition of the patient in whom the surface of a complete laceration has been allowed to heal over is so unfortunate that an attempt at its repair should invariably be made. In exceptional cases, in which the condition of the patient does not permit any unnecessary loss of time, a successful result may occasionally be obtained by the method just described for lacerations of the second degree; but the consequences of a failure are here so important that it is always better to repair such lacerations by the more exact methods, even though it should be necessary to defer the operation till the next morning, or even for twenty-four hours. The wound having been carefully cleansed and trimmed, the rectal edges of the tear should be brought together by a row of buried catgut sutures, which should be placed immediately under, but should not include, the rectal mucous membrane (Fig. 98). These sutures should be introduced with a needle-holder and a small curved needle, and should be at once tied from above downward; after which the remainder of the wound may be brought together by either of the methods already described.

In all primary operations upon the lacerated perinæum, it must be remembered that an extreme amount of swelling is certain to appear within the first forty-eight hours, and that unless the sutures are very loosely tied they will be certain to cause the patient great pain, or their tension may even produce extensive sloughing; for this reason they should be brought together so loosely that the edges of the wound are barely in contact, the object being to prevent an effusion of blood between the wounded surfaces rather than to exert any pressure whatsoever upon them.

After-care.—During convalescence, complete avoidance of muscular exertion, however slight, must be rigorously enjoined, though passive movements may be permitted to almost any extent; and it must be impressed upon the patient that this restriction is reasonable, the fact being that every voluntary movement of the muscles of the body and lower extremity involves almost surely a contraction of the perineal and pelvic muscles, whose insertions are held together by the sutures, but that no attitude which is likely to be assumed by passive motion can exert any effect whatsoever upon the deeper and more important portions of the wound. A towel should be bound loosely about the knees, not so much to confine them as to remind the patient to avoid voluntary motions.

The nurse or physician should turn the patient from side to side at intervals of a few hours, both to lessen the discomfort incidental to the maintenance of one constrained position and to prevent the occurrence of bed-sores, or of tenderness over the sacrum and trochanters, each of which spots, with the surrounding skin, should be sponged several times daily with alcohol or with a mixture of equal parts of alcohol and water.

If wire sutures have been used within the vagina, the ends should be left long, brought out through the vulva and fastened together, their sharp points being concealed within a bit of rubber tubing. If any other material has been tied within the vagina no dressing is necessary; if wire sutures were used and fastened externally, the ends should be cut short and turned down, and the external surface should be covered in all cases by a few thicknesses of absorbent gauze or other material which has been wrung out of a corrosive-sublimate solution, and should be thickly dusted with iodoform.

If the nurse in attendance can be trusted to make constant use of the catheter, without disturbance of the wound and without the introduction of lochia to the bladder, the catheter should be passed every six hours; but with the majority of nurses the risks of cystitis have seemed to me a greater evil than the contact of urine with the wound, and I have never seen reason to regret my usual practice of permitting the patient to pass her own water whenever this is possible, but in such cases the nurse is instructed to pour a quantity of a corrosive or creolin solution over the vulva immediately after each micturition, and then turns the patient upon her side in order to promote drainage of the vagina.

After secondary operations upon the perinæum, the bowels may be treated in two ways: the patient may be kept upon a low diet, and dejections prevented by a free use of opiates until the eighth or ninth day, when a dejection of soft consistency may usually be procured by the use of enemata of olive oil and the administration of repeated small doses of a simple cathartic; or a sustaining diet may be given, but those articles avoided which are likely to produce a large amount of fæces, and the bowels kept open from the start.

In obstetric practice, however, neither of these courses is entirely suitable. The sensitive condition of the puerpera renders prolonged constipation distinctly inadvisable; the use of opium in amount sufficient to insure it is certain to exert a harmful influence on the establishment of the milk and on the patient's general condition (to say nothing upon its probable effect upon her baby); and the requirements of convalescence demand imperatively that the diet should be regulated by the needs of the system rather than by any local lesion; while, upon the other hand, the accumulation of hardened fæces which has usually been amassed during the later months of pregnancy makes it extremely likely that, if the open treatment be adopted, the first dejection will be sufficiently large and firm to put an improper strain upon the sutures.

Under these circumstances a compromise between the two methods is the best course. The bowels usually tend to spontaneous constipation, no cathartic should be administered, and small doses of opium should be cautiously used, if occasion arises, until the secondary effects of constipation are shown by the appearance of headache, malaise, and a slight elevation of the temperature. An oil enema should then be administered and followed by compound rhubarb pills or by some of the other cathartics elsewhere recommended, in small and repeated doses.[1] The necessity for the use of cathartics commonly appears on the fourth or fifth day, and the diet should be restricted to gruels, broths, and eggs until a suitable evacuation has been obtained, after which a gradual change to the usual diet should be permitted.

If silkworm-gut, silk, or wire sutures have been tied externally, they should be inspected on the sixth and on each subsequent day, and should be removed one by one as they are seen to loosen. If silk sutures have been used and tied within the vagina, they should be removed upon the eighth or ninth day; wire or silkworm-gut may remain a few days longer; catgut in any situation requires no attention.

The patient should remain in bed for at least two weeks, and after extensive lacerations for twenty or thirty days; since the strain imposed upon the tissues by the erect position and by active movements at an earlier period may result in the loss of an apparently good union.

Rupture of Blood-vessels, and Emphysema.

The straining of excessive labor may occasionally produce a rupture of a subcutaneous vein, or lacerations of the superficial alveolæ at the apex of the lungs. Rupture of a vein produces a subcutaneous ecchymosis; which, even though extensive, needs no treatment, and resolves spontaneously within the space of a few days. Rupture at the apex of the lungs results in an emphysema of the subcutaneous connective tissue, which spreads rapidly and may produce an enormous swelling of the neck and chest; the tumor crepitates on pressure, and is tympanitic on percussion. The accident has no results, except the alarm which it always occasions the patient; no treatment is indicated, as the tumor always disappears spontaneously.

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[1] See page 331.

CHAPTER XXI.

MULTIPLE PREGNANCIES. ABNORMALITIES AND MALFORMATIONS OF THE FŒTUS. ACCIDENTS TO THE FŒTUS.

MULTIPLE PREGNANCIES.

THE only form of multiple pregnancy which is sufficiently frequent to be possessed of practical importance is twins, which occur upon an average once in every two hundred confinements; triplets are seen once in five thousand; and the higher numbers with extreme infrequency.

The occurrence of twin pregnancy may be due to either of two causes. In the one form, two ova are fertilized by the same coitus, or by two connections which occur within a short time of each other; in the other the double fœtation is due to the formation of a double yolk, or to the complete division of a single yolk, within one ovum. In the first variety the placenta and membranes are originally separate, and if fused during subsequent growth have no vascular connections; in the second the two children are contained within a single amniotic cavity, and are nourished by a single placenta, the cords being usually separate. Twins contained in separate amniotic cavities, *i.e.*, those which spring from separate ova, may be of the same or different sexes; but those which originate from a single ovum are invariably of the same sex.

Twin pregnancies are usually attended by an excessive development of the symptoms of distention, and are not infrequently terminated by a spontaneous, premature labor, due to the same causes.

PRESENTATION.—While a double vertex presentation is the most common, presentations of one vertex and one breech are not infrequent, and all varieties of malpresentations are far more common than in single pregnancy; malpresentations of the second child being especially frequent on account of the greater mobility which it enjoys after the birth of the first. The children are usually small, and not infrequently feeble.

CONDUCT OF LABOR.—The first stage of labor is apt to be tedious on account of weakness of the uterine fibre, due to its distention. In vertex presentations, the descent of the first child is apt to be rapid on account of its small size; but the first birth is usually followed by an interval of varying length, during which contractions are absent, and the uterine fibre is busied chiefly in retraction. The birth of the first child may be followed by the expulsion of its placenta, but not infrequently neither placenta is detached until after the birth of both children. At the end of from twenty minutes to one or more hours, the second child is ordinarily expelled if the presentation is natural, but its birth may occasionally be delayed for a much longer time by uterine inertia.

The distention of the uterus, which is usual in twin pregnancy, always exposes the patient to a greatly increased liability to post-partum hæmorrhage, from the resulting atony of the uterine fibre.

If the birth of the first twin is followed by expulsion of its placenta, if uterine action fails to appear and the os recontracts, and it appears to be probable that the second child may be retrained in utero for some days or weeks, no active treatment should be adopted; since numerous cases have been recorded in which the second twin has been carried for some weeks after the expulsion of the first, to be subsequently born with a much improved chance of survival. If, however, the first placenta is not expelled, it is unwise to permit this recontraction, since a prolonged retention of the placenta would almost certainly result in the production of sepsis, or of hæmorrhage, during the interval; and because, if the child is to be extracted by the efforts of art, it is far better, in the interests of both patients, that this should be done while good dilatation still obtains. The best rule of practice is therefore that, if at the end of an hour the first placenta is undelivered and the uterus shows no signs of resuming its efforts, the child should be extracted by forceps if the head presents, and otherwise by version, either operation being usually extremely easy by reason of the small size of the passenger and the previous dilatation of the passage.

LOCKED HEADS.—It usually happens in twin pregnancy that the presenting part of one child enters the pelvis in advance of the other, and if uterine inertia makes it necessary to promote engagement by rupture of the membranes, one of the presenting parts should be pressed into the brim before the rupture is effected; but if the children are small, it may sometimes happen that the head of the second child enters the pelvis alongside the neck and shoulders of the first.

This accident may happen in either of two ways. In double-vertex presentation both heads may engage in the pelvis at the same time, or with one but slightly in advance of the other (Fig.

99). In presentations of the breech and head, if the breech is permitted to enter first, the head of the second child may occasionally engage in the pelvis, in advance of the after-coming head of the first, in such a manner that each head is opposite to the neck of the other child (Fig. 100). Neither variety can occur unless both children are small, but either is sure to produce considerable difficulty in spite of this fact. In double-head presentations the prognosis is especially bad for the first child, on account of the probability of an interruption of its cerebral circulation, by the pressure of the second child against the vessels of its neck. The treatment of the first variety consists in pushing back one head if possible, and, if this attempt fail, in the application of forceps to the first head, and later, if necessary, to the second; and this should be followed by decapitation or perforation of the first head, or by perforation of the second in the not improbable event of its failure. The diagnosis of the second form of locked heads is rarely made until after the birth of the first body, when the arrest of the head leads to the passage of the hand into the vagina, and the presence of the second head is recognized. In this variety the first child is almost never saved, and the second very rarely. With very small children both heads may be expelled by the efforts of nature, the head of the second child being born first, but in almost all cases it is necessary to apply forceps, first to the head of the second child, and then to that of the first. Should forceps fail, perforation of the after-coming head of the first child should be attempted, but is always extremely difficult and sometimes impossible. Its decapitation may sometimes make it possible to push back its head. The head of the second child

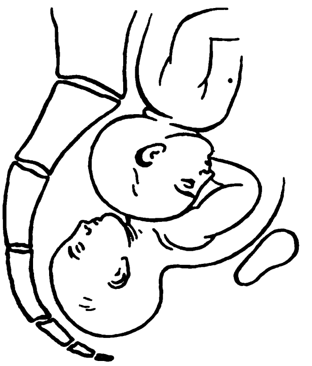

FIG. 99.—FIRST VARIETY OF LOCKED HEADS IN TWINS.

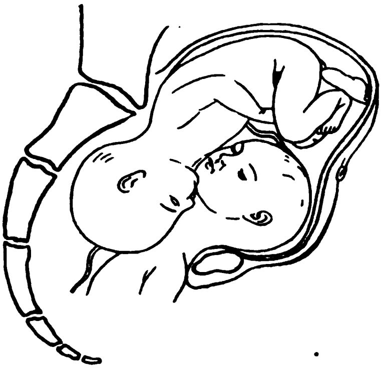

FIG. 100.—SECOND VARIETY OF LOCKED HEADS IN TWINS.

should be spared, if this is in any way possible, on account of its better chances of life.

In twin labors, the possibility that the first child may be transverse, and the presentation complicated by a prolapse of the legs of the second, must never be forgotten.

ABNORMALITIES OF THE FŒTUS.

MONSTROSITIES.—That strong mental impressions received by the mother during the course of pregnancy may influence the form of the unborn child has always been a matter of popular belief, but it has been received with the greatest scepticism by the profession. The evidence in support of this view has been, however, gradually increased, by the accumulation of a larger and larger number of authenticated cases, until the probability of its occasional occurrence appears so great that it is certainly wise to use every effort to prevent women of child-bearing age from the sight of horrible and disgusting malformations and accidents, and especially those who are pregnant. Among the many congenital malformations which are occasionally seen, those which obstruct labor, and those which result in the production of children who are so imperfectly developed or so far deformed as to be either incapable of supporting life or unfitted for the performance of its usual duties, are alone of obstetrical interest; all others belonging rather to the domain of orthopedic surgery.

The common imperfections which necessarily affect life are anencephalia, and imperforate anus or rectum. Those which obstruct labor are meningocele, encephalocele, spina bifida, hydrocephalus, and the double monstrosities due to an incomplete division of the germinative vesicle.

ANENCEPHALIA.—The deformity known as anencephalia consists of an absence of the cranial vault and of the greater portion, or whole, of the brain; the sella turcica and base of the skull being exposd to view, and covered only by the membranes. The birth of an anencephalic .fœtus is by no means rare; they are usually accompanied by hydramnios; and transverse or breech presentations are not infrequent, though that of the face is rather the most common. If the presentation is transverse or pelvic, the diagnosis is rarely made until after the extraction of the child; though some such deformity may be suspected from the presence of hydramnios and of other minor abnormalities of the child, such as club feet or hands. If the face presents, the absence of the cranium is usually perceived during the course of the second stage. The body of such a fœtus is often large and well developed, and, if the presentation was cephalic, its size not infrequently occasions considerable difficulty in its extraction—a difficulty which is due, in part at least, to the lack of preparation of the maternal soft parts by the passage of a full-sized head. Such children are occasionally born alive, but, as their continued existence is absolutely impossible, no effort should be used to preserve or prolong their lives, and it is distinctly a more fortunate result if they die during the process of birth.

IMPERFORATE ANUS OR RECTUM.—In the absence of the anus, the diagnosis is made at sight; but in the more common varieties of the deformity, in which the anus is normal, and the imperfection of the canal is within the orifice, the diagnosis is seldom made until the failure of the child to pass fæces and the consequent distention of its abdomen suggest a rectal examination. The imperfection is not uncommon, and the possibility of such an abnormality should always be borne in mind, and should lead to the passage of the little finger into the rectum of any child which fails to pass meconium within a few hours of birth; since the only possibility of prolonging its life is by a prompt resort to operative measures.

Treatment.—Conservative treatment is of course hopeless; the operative measures in vogue are the passage of a trocar through the obstruction, in the hope of reaching the sigmoid flexure without crossing the peritoneal cavity; dissection upward from the perinæum in search of the upper portion of the bowel; and the construction of an artificial anus in the groin or lumbar region; but the discussion of the choice of operation belongs rather to works on surgery than to text-books on obstetrics.

Prognosis.—The immediate prognosis is extremely unfavorable; and even if the operation be recovered from, the subsequent condition of the child is so extremely unfortunate that its survival is often to be regretted; but since permanent successes have been occasionally reported, it should always be undertaken.[1]

MENINGOCELE.—Meningoceles are cystic tumors, outside the cranium and beneath the scalp, communicating with the intracranial space, and filled with serous fluid, which may, however, become separated from the cavity of the cranium during the later months of pregnancy. When such tumors are sufficient to cause obstruction to labor, their fluid contents should be removed by aspiration with a small trocar or large aspirating needle.

ENCEPHALOCELE.—Encephalocele differs from meningocele, only in the fact that the sac contains a portion of brain tissue, which is spread out over the contained fluid. The prognosis of encephalocele is always bad, and that of meningocele is only better from the fact that if the communication with the intracranial cavity is very small, it may occasionally become obliterated and permit of a recovery.

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[1] A very remarkable case of imperforate rectum in a seven-months' child, reported by Dr. George G. Hayward (Boston Medical and Surgical Journal, vol. vi., No. 20, pp. 467 and 475) suggests the possibility that the division of a thin partition across the lower portion of the rectum may be followed by a resumption of the natural processes of development, the arrest of which is the cause of the deformity; and this opinion, if correct, would make the operation distinctly advisable whenever a premature child is found to be so afflicted.

SPINA BIFIDA.—The condition known as spina bifida consists of an absence of the posterior arches of one or more contiguous vertebræ, and a protrusion through the space thus formed of a cystic tumor whose serous contents are directly continuous with the cerebro-spinal fluid. The tumor is usually small; when it is sufficient to obstruct labor, it should be emptied by puncture, which may be undertaken without the least hesitation, from the fact that such children seldom live.

HYDROCEPHALUS.—Hydrocephalus may be either congenital or acquired, but only the first form concerns us here. It is the result of the presence of an abnormal quantity of the intra-cerebral fluid, and results in the production of an abnormally large and an unduly flexible head. The fluid is usually contained within the dilated ventricles, and is covered by a thin layer of expanded brain substance.

Breech presentations are extremely frequent, but the children seldom survive. Labor is natural in about 25% of all cases, a result which is due to the facts that the bones are usually but slightly ossified, and that the sutures and fontanelle are so wide as to permit a ready adaptation of the head to the shape of the passage through which it must be forced.

Diagnosis.—In breech presentations the diagnosis is rarely reached until the after-coming head is arrested at the superior strait, when its size and consistency should at once suggest the cause of delay. In head presentations it is usually easy, and is to be determined by perceiving that the curvature of the presenting part is abnormally slight, that the sutures and fontanelles are wide and soft, and that the head is abnormally large when examined by bimanual palpation; in extreme cases fluctuation may sometimes be detected.

Treatment.—Treatment should consist of perforation; or puncture and the withdrawal of the contained fluid, by a trocar or aspirating needle. The forceps should never be applied to the hydrocephalic head, since they almost invariably slip. In well-marked cases the children never live, and craniotomy may be freely resorted to; unless the religious feelings of the parents, or some medico-legal relation, such as the inheritance of property, make it desirable that the child should be born alive, even if it die at once.

COMPOSITE MONSTERS.—Composite monsters occur from a partial division of the germinative area of an impregnated ovum, which if carried to completion would have resulted in the production of twins, and may consist of a more or less complete fusion of the heads with separate bodies or of united bodies with separate heads.

Fusion of the heads is comparatively rare. When it exists, if the head presents and becomes arrested, the progress of the case differs but little from that of an abnormally large single head; but if the deformity can be proved, perforation should be resorted to in preference to any prolonged efforts at delivery by forceps, since the continued life of such a monster is hardly possible. In any other presentation a foot should be seized, and the body drawn down, until the head is within the reach of the forceps; this should be delivered by forceps, or by perforation if necessary, and followed by the other body.

The more common form of fusion of the bodies varies in degree from those monsters, on the one hand, which possess eight limbs and two heads attached to a single trunk, to the union of separate children by a flexible band such as existed in the case of the famous Siamese twins. As a general rule, the more complete the fusion, the less the chance for the ultimate survival of the children; but since such monsters not infrequently live, their lives must be respected, though if death be inevitable it is probably seldom regretted. The birth of such a monstrosity is of course only possible when it is of small size. The labors have been natural in about 50% of the reported cases—a result which is, however, largely due to the fact of the great frequency of premature labor.

If the heads present, the usual mechanism of delivery is the expulsion of one head, while the other is delayed above the brim; delivery of the bodies more or less simultaneously, by a process closely analogous to spontaneous evolution; and, finally, delivery of the second head. In such presentations the deformity is seldom if ever diagnosticated until after delivery of the first head, when the mechanism just described should be imitated by the obstetrician; but if the diagnosis is established before the engagement of the head, the children should be turned, breech deliveries being much the most favorable for the children; all four feet should be seized, the bodies should be extracted simultaneously, and, after the release of the arms, should be swept upward over the abdomen of the mother, when the posterior head commonly enters the pelvis in advance of its fellow, is delivered first, and is followed by the other.

OTHER ABNORMALITIES OF THE FŒTUS.—An abnormal increase of the size of the fœtus may be due to its symmetrical enlargement; to the existence of an abnormally large or over-firmly ossified head, on a body of moderate size; or to enlargement of the body, with a normal head.

Symmetrical Enlargement.—Symmetrical increase of the fœtus may result, according to its degree and the size of the individual pelvis, in the necessity for forceps or version, or, in rare cases, for craniotomy. Excessive ossification not infrequently causes a difficulty in the delivery of the head, which is due to the inability of the cranial bones to yield to the moulding processes of labor, and which may result in an obstinate arrest of a comparatively small head. If, at the time when the arrest occurs, the head is already in the excavation, the forceps should be applied, and this the more readily from the fact that such children are usually able to endure extremely powerful tractions with ease, since the brain and cerebral circulation are to a great extent protected from pressure by the non-yielding character of their envelopment; but if the head is arrested in or above the superior strait, version is usually the preferable operation, since it is practically certain that a greater or less amount of moulding is a necessary preliminary to the passage of the head, and because this is far more likely to be obtained during the passage of the after-coming head, for reasons which have been already explained.[1]

Excessive Size of the Body.—Excessive size of the body is not an infrequent occurrence. Delay of the body after the birth of the head justifies the use of a very considerable degree of force in the practice of the ordinary methods of extraction, for the double reason that the soft body of the child is unlikely to cause a serious lesion to the more important soft parts of the mother, and that the risk of injury to the child is less important than the certainty of its asphyxiation if not promptly delivered.

When the size of the fœtal body is so extreme as to cause arrest of the shoulders at the superior strait while the head is in the excavation, it usually results in the loss of the child by craniotomy, or during prolonged efforts at extraction by forceps: it may sometimes require the application of the cranioclast or cephalotribe to the thorax and shoulders, or, in extreme cases, amputation of the arms and shoulders by means of the écraseur or decapitating hook or knife.

Tumors of the Trunk.—Ascites, anasarca, hydro-thorax, and post-mortem emphysema, or an enlargement of the abdomen due to an imperforate condition of the bladder or ureters, may result in arrest of the body, but the diagnosis is usually made only after the introduction of the hand, and the treatment should always be limited to perforation, since the life of such a child is hopeless. The opening may be made by the use of the scissors, knife, or trocar, according to the accessibility of the obstruction.

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[1] See page 254.

ACCIDENTS TO THE FŒTUS.

ASPHYXIA NEONATORUM.—Asphyxia neonatorum is caused by a deficient oxygenation of the blood, due to compression of the cord during the course of labor, and may be complicated by a depressed condition of the respiratory centres, due to anæmia, from compression of the brain.

It presents two varieties, or rather degrees of severity—blue asphyxia, in which the pulse is slow and strong, the muscles more or less rigid, and the child cyanosed; and pale asphyxia, in which the pulse is rapid and feeble, the muscles are flabby, *i.e.*, the head, limbs, and lower jaw drop loosely, and the child is pale and anæmic. The latter form may be complicated by the presence of liquor amnii in the lungs if the cerebral anæmia has been profound enough to cause respiration to occur in utero, at a time when the mouth was in contact with the liquor. Blue asphyxia is soon followed by the pale form if respiration is not soon established.

TREATMENT—PROPHYLAXIS.—The anticipation of asphyxia by means of frequent examinations of the fœtal heart with the stethoscope, and prompt delivery whenever it is found to be steadily rising or intermittent; and care to flex the wrist of the internal hand during the extraction of the after-coming head to an extent which permits the atmosperic air to have access to the mouth, will greatly diminish the number of cases in which the treatment of asphyxia is indicated.

RESUSCITATION.—The means of resuscitating asphyxiated infants consist of expedients for exciting natural respiration, and the various methods of maintaining it artificially.

The methods in use for exciting respiration are all founded on the view that, although the first respiration may occasionally be provoked by the alteration of circulation which occurs at birth, it is usually a reflex result of the stimulation of the cutaneous nerves which follows the removal of the child from a warm fluid to comparatively cold, dry air. This belief rests upon the results of experimental research in animals, in whom it has been found that when the uterus is opened and the cord tied, or when the placenta is separated in utero without in any other way disturbing the fœtus, respirations are sometimes excited by the cerebral anæmia which results from the cessation of the utero-placental circulation; but that in the majority of cases, the fœtus dies without making any attempt to fill its lungs: while, upon the other hand, if the uterus is perforated, and the external skin is scratched or otherwise stimulated, or if the fœtus is removed from the uterus and exposed to the air with as little manipulation as possible and without interference with its circulation, respiration is uniformly excited, the method of removal being the most efficient.

All methods of artificial respiration are attempts to produce expiration by compression of the chest, and inspiration by causing expansion of the chest, by traction on the ribs through the pectorales and other auxiliary muscles.

In blue asphyxia, the stimulative methods are usually all that are needed; and in the majority of cases, simple stimulation of the external skin is sufficient to awaken respiration; but great care must always be taken to maintain the body heat throughout the process, and to avoid the exhaustion of too much manipulation.

The child should be held head downward, the mouth and fauces should be cleared of mucus by the fingers, and the position should be maintained for some seconds, in order to favor drainage of any liquor amnii which may have been swallowed or drawn into the trachea. The infant should then be completely immersed, with the exception of its face, for several minutes, in the hottest water which can be borne without scalding, removed for a few seconds for a brief plunge into ice-cold water, and then at once replaced in the hot water to prevent a serious loss of heat. If any attempt at respiration is excited during this process, it should be persevered in, and then usually results in the production of good respiration. When inspiration has become regular and sufficiently frequent, the child should be sharply slapped with the hand or with the wet fringes of a towel, until it cries vigorously, in order to secure complete inflation of its lungs; but care should be taken that its tissues are not bruised, the back and buttocks being the preferable places for the slapping.

In the milder cases of pale asphyixa, the same process is often successful; but care should be observed here to hold the child with the head downward, not only during the process of slapping, but whenever opportunity permits. The inverted position is here of great value, because it favors the gravitation of blood to the head, and consequent relief of the cerebral anæmia. This is of the last importance, because, if the first stimulating effect of the deprivation of blood fails to awaken the respiratory centres, their revival is hopeless while the local anæmia continues. In pale asphyxia, especially, all manipulations and rough handling of the child should be reduced to a minimum; since a marked degree of exhaustion is to be expected in all such cases, and the vitality of newborn infants is so slight that a very slight increase of shock may be promptly fatal.

If the case appears serious, no great time should be lost in these methods, but artificial respiration should be at once resorted to, and maintained until the child breathes regularly without aid. In pale asphyixa, uncomplicated by aspiration of fluid, a large proportion of children may be saved by artificial respiration, provided that the heart be still beating, and that the inverted position is persistently adhered to. When asphyxia neonatorum is complicated by inspiration of the liquor amnii, the prognosis is extremely grave; but, since apparently hopeless cases are sometimes saved, artificial respiration should be persevered in for at least half an hour. When the liquor has been inspired to any considerable amount, the only chance for resuscitation of the child is to secure drainage of the fluid by holding it with its head downward for many minutes, assisting the action of gravity by the simultaneous production of artificial respiration.

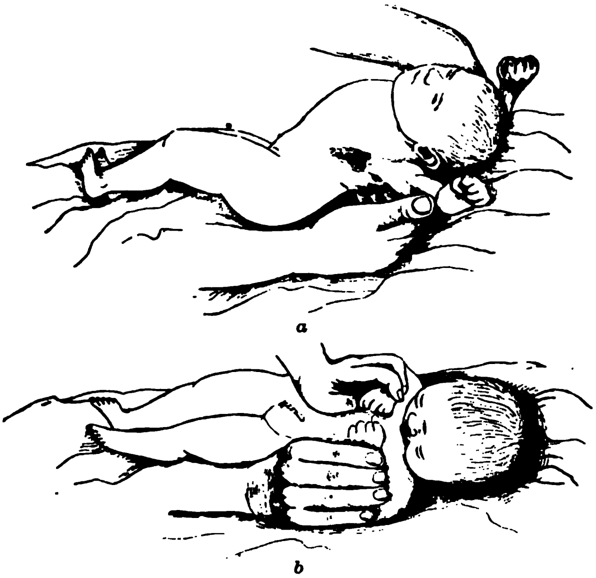

FIG. 101.—SYLVESTER'S METHOD OF ARTIFICIAL RESPIRATION. *a*, Inspiration; *b*, expiration.

ARTIFICIAL RESPIRATION—*Sylvester's Method.* — The child is laid upon a table or other flat surface, with its back slightly arched over a folded towel or other compress (Fig. 101): the operator grasps a forearm in each hand, presses them lightly against the lower part of the chest to effect expiration; and extends them fully by the sides of the head, in order to cause inspiration by raising the ribs, by traction upon the origins of the auxiliary muscles. The motions should be repeated from six to ten times a minute. The method has the advantage of reducing the handling of the child to a minimum, but is somewhat inefficient.

Schultze's Method.—In this procedure the child is suspended by the arms, with its back toward the operator. Each arm is held by a thumb and forefinger, while the other fingers support the back, as seen in Fig. 102. The child is then swung sharply upward into the position shown in Fig. 103, and after a few seconds the first position is resumed. In the first position the traction of the head and neck upon the auxiliary muscles tends to elevate the ribs, which in the second are depressed by the forward flexion of the whole body. The method exposes the child to considerable risk of exhaustion from the somewhat rough handling which it involves; but it is thoroughly efficient, and is to be recommended for mild cases.

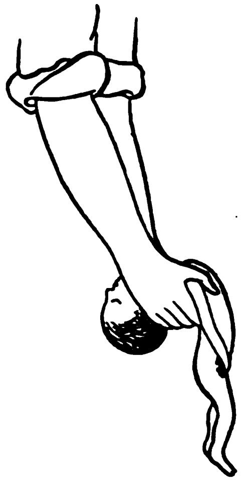

FIG. 102.—SCHULTZE'S METHOD OF ARTIFICIAL RESPIRATION. Inspiration.

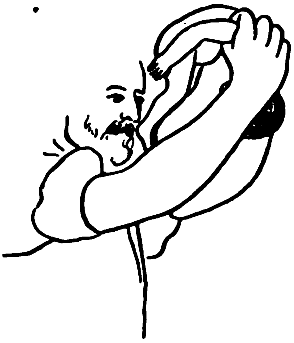

FIG. 103.—SCHULTZE'S METHOD OF ARTIFICIAL RESPIRATION. Expiration.

Author's Method.—This possesses the important advantage of combining a most efficient artificial respiration with a minimum of manipulation, and with a constant maintenance of that most important factor, the inverted position.

The pelvis of the child is encircled by the thumb and little finger of one hand, while the other fingers support the back (Fig. 104). In this position the weight of the dependent head and arms produces the fullest possible expansion of the chest. At brief intervals the other hand is passed across the chest, and the second and third fingers are hooked along the opposite sides of the neck, when, by light pressure of both hands, the child's body is sharply flexed and the chest is firmly compressed (Fig. 105).

This method is especially valuable in cases in which mucus or liquor amnii has been inspired, in which the contained fluid can usually be observed to drip from the mouth and nose under the influence of gravity during each compression of the chest; and when this is seen, the little finger of the anterior hand should be made to clear the mouth and fauces at the end of each movement of expiration.

Faradism.—The application of faradic electricity to the chest is a method of great value and, if a battery is at hand, should be given a trial; one pole being applied constantly over the phrenic nerve, just outside the origin of the sterno-mastoid muscle, and the other brought into momentary contact with any part of the chest, at intervals of from ten to twenty seconds. The contact must be made as brief as possible, since any over-stimulation of the respiratory nerves may result in their paralysis; and each inspiration which is produced by the electricity should be succeeded by mechanical compression of the chest between the hands of the operator, to insure the expulsion of the inspired air.

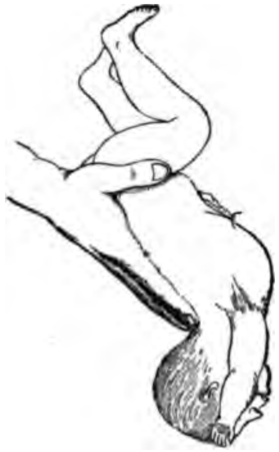

FIG. 104.—AUTHOR'S METHOD OF ARTIFICIAL RESPIRATION. Inspiration.

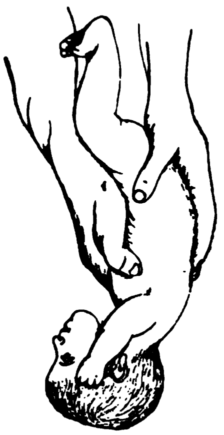

FIG. 105.—AUTHOR'S METHOD OF ARTIFICIAL RESPIRATION. Expiration.

Mouth-to-mouth Insufflation and Catherization of the Trachea.—In mouth-to-mouth insufflation the fauces are cleared by the little finger, and the child is laid upon its back upon a table; the face and nose being covered by a thin towel. The operator clears his lungs of residual air, inflates them, and, placing his mouth to the face of the infant in such a manner that both its nose and mouth are included within it, gently expels a little air from his lungs. Each inflation must of course be followed by compression of the chest with the hand in order to produce expiration.

The method is sometimes valuable, but possesses the disadvantages that a too vigorous expiration may cause lacerations of the pulmonary tissues of the child, and that the air which is expired from the attendant's lungs often passes through the œsophagus into the infant's stomach.

Catherization of the Trachea.—The forefinger is passed into the mouth until it reaches the larynx and feels the arytenoid cartilages, and a small (No. 10 F.) English-webbing catheter is passed along its flexor surface, and guided through the glottis. The operator then blows gently into the catheter after having expelled the residual air from his own lungs, taking care, however, that the amount of air which he expires is no more than the small quantity which the chest of a new-born infant is capable of containing.

When executed promptly and with sufficient caution against any over-inflation of the infant's lungs, the method is extremely valuable; but the introduction of the catheter is not always easy, and the element of time is of so much importance that the more ready methods are usually to be preferred. Such a catheter should, however, be kept within the obstetric bag, for use after the failure of other means.

It has lately been suggested that when the excitation of breathing is difficult, and the heart is perceived to be failing, both processes may be stimulated by the hypodermic administration of from five to ten drops of brandy or ether; and the suggestion is well worth a trial.

During the process of artificial respiration, loss of body heat should be prevented by occasional immersions in the hot water; and when voluntary inspiration has been once excited, a plunge should be occasionally resorted to as an additional stimulating measure. The artificial respirations should be produced at regular intervals until natural breathing is well established. The child should then be warmly wrapped, carefully watched, and handled but little for several days; for even after it has been made to cry vigorously, its future prospects are less bright than those of an un-asphyxiated child, nearly 50% of such infants dying within the first week.

ACCIDENTS TO THE FŒTUS DURING LABOR.

FORCEPS MARKS.—These may be deep or superficial; the superficial injuries are nothing more than a separation of the scarf skin, due to forcible friction against the blades during their introduction, or to their slipping during traction. Such marks are extremely disfiguring at the moment, but require no treatment, and leave no traces of their presence.

Any undue compression by the forceps may result in the production of subcutaneous bruises of the face or scalp. These appear as indurated subcutaneous phlegmons, which feel like hard buttons beneath the skin; like the more superficial marks, they need no treatment, and never result in a scar, unless they are sufficiently extreme to cause sloughing, in which case they may be followed by serious disfigurements.

FACIAL PARALYSIS.—When the forceps are so applied that the tips compress the facial nerve against the bone at its origin from the skull, the pressure may result in the production of a temporary paralysis of the muscles which it supplies. The affection is usually unilateral, and generally disappears, without treatment, in less than a week. In the rare cases in which it is bilateral, it may induce an inability to nurse, which, if the act of nursing is not replaced by the injection of milk into the stomach through a soft-rubber catheter, is likely to be fatal. By the use of gavage, it is, however, easy to sustain life until the affection disappears.

FRACTURE OF THE FŒTAL SKULL.—This accident is usually a result either of an unduly forcible and rapid delivery of a large head or of some violation of the proper mechanism of labor during an operative delivery. Such children are usually stillborn, from injury to the brain; and even if born alive, are apt to die of meningeal hæmorrhage within a few minutes or hours.

MENINGEAL HÆMORRHAGES.—The overlapping of the flat bones of the skull which necessarily occurs during difficult labor may result, occasionally in natural but more frequently during operative delivery, in laceration of the dura mater and of the vessels which it contains. Its results depend upon the situation of the tear and the size of the lacerated vessels; it is more serious when the tear is situated at the base of the skull than in any other situation.

When this accident has occurred, the compression of the cerebral substance has usually been such that the child is extracted in pale asphyxia. If the injury to the meninges was severe, the diminution of the intra-cranial pressure which is consequent on delivery is usually followed by the rapid production of a hæmorrhage which is sufficient to destroy life before respiration starts. In less extensive lacerations, respiration may be excited, but only to become progressively slower and more feeble until death occurs; in such cases a post-mortem will disclose the presence of a clot of extravasated blood at the base of the brain. When the hæmorrhage is insufficient to cause death, the child is usually feeble and apathetic for many days; its recovery may then be complete, or it may be followed by the appearance of spastic hemiplegia or other paralyses, either immediately or after an interval of one or more years.

FRACTURES OF THE UPPER ARM OR CLAVICLE.—These fractures are usually produced during the extraction of the after-coming arms; exceptionally, in difficult extractions of the body in head presentations; the fractures are of course always of the green-stick variety. Fractures of the clavicle may be left untreated, since they rarely result in any permanent deformity. Fractures of the upper arm would probably unite spontaneously, and are seldom followed by any ill results unless the fracture is near one of the centres of ossification; in which case the subsequent growth of the bone may be interfered with, and the accident then results in a short arm. The treatment should be confined to straightening the affected bone, and confining it between splints of moderately thick pasteboard or mere compresses of folded cloth; the arm should be lightly bound to the side, but care should be taken that the bandage is not sufficiently tight to compress the chest and interfere with respiration.

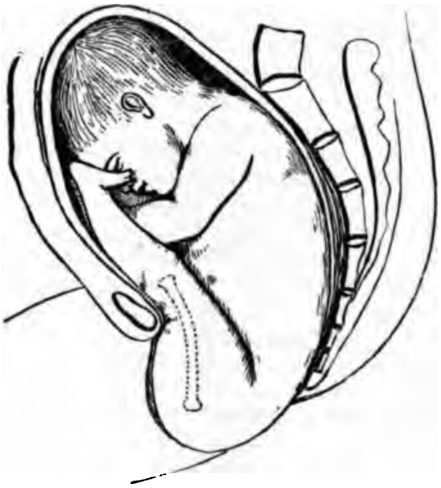

FIG. 106.—LATERAL PRESSURE ON ANTERIOR THIGH DURING THE EXPULSION OF A POSTERIOR POSITION OF THE BREECH.

FRACTURES OF THE THIGH.—These are usually produced during the extraction of the breech in cases in which the legs are extended across the chest, and the anterior limb is usually the seat of the injury.

It will be seen by reference to Fig. 106 that in posterior posisitions of the breech, the anterior thigh is necessarily exposed to considerable lateral pressure from the edge of the symphysis during the lateral flexion of the trunk which accompanies the expulsion of the hips; and it can be readily understood that the mere insertion of the finger into the groin may increase this pressure sufficiently to cause fracture, unless the hips are at the same time pressed backward. Injudicous traction in the direction of the arrow would certainly be followed by the accident. The prognosis and treatment are identical with those of fractures of the humerus.

PART VI.—THE PUERPERIUM.

CHAPTER XXII.

NORMAL CONVALESCENCE.

THOUGH convalescence from labor is a physiological process, it must not be forgotten that the puerperal woman is not in a condition of ordinary health, and that, though the normal puerpera is not ill, she is in a state of markedly unstable equilibrium, in which her sensibility to the conditions of her environment is very greatly increased, and in which very slight external stimuli, either physical or mental, result in entirely disproportionate disturbances of her pulse, temperature, and general condition.

Under the most favorable circumstances the pulse is usually slightly high and much more variable than in health; the temperature, in the absence of complications, should remain below 99 F., but very slight disturbances of the health may produce a degree of pyrexia which would be entirely unexpected from them at any other time. It is therefore necessary that the cause of every rise in temperature, however slight, should be carefully diagnosticated: the usual reasons for an elevation which is not dependent on sepsis being constipation of the bowels, inflammation of the breasts, a disturbed condition of the nervous system, and intercurrent systemic diseases.

REST AND QUIET.—The occasional occurrence of a distinctly high temperature during the puerperium, from functional disturbances of the nervous system, uncomplicated by any other condition, is a phenomenon which has been so frequently observed as to be beyond reasonable doubt; and since the condition of the nervous system is such that very slight causes may produce a marked and lasting excitement, it is an important part of the duty of the attendants of every puerperal woman to guard her rest and shield her from nervous excitement in every possible way. It is for this reason that labors which result in still-born children are apt to be followed by protracted and troublesome convalescence; and for this reason also a rigid exclusion of visitors from the room of the patient during the first week is to be recommended: the best plan being to permit the patient's husband to visit her twice daily for a few moments, and her mother, if present in the house, to see her once; both being warned to reduce their conversation with her to a minimum, and to especially avoid all topics which would in any way interest or excite her; but while this is the proper rule, the conditions of family practice will oblige the physician to relax its vigor in many cases, so long as the convalescence is normal. It should be strictly enforced whenever the nervous condition of the patient is anything but satisfactory.

Nothing exerts a more important influence upon the whole course of convalescence from labor than the manner in which the patient passes the first few hours after the birth of her child. It is to be remembered that at the conclusion of parturition the mother is exhausted, not only by the extreme and prolonged muscular efforts of labor, but by the continued endurance of extreme pain; and that, though she is often excited and exultant, in her sense of relief from pain and possession of the baby, she is nevertheless in urgent need of both physical and mental rest. It is therefore important that from the very moment of delivery the room should be quiet, and that the attendants should maintain a calm, collected, and soothing manner, and should avoid all unnecessary conversation with each other or the patient.

The baby should not be urged upon the patient's attention until she asks to see it; it should then be shown to her for a moment and removed to the next room. The physician should himself remain within call, and should see that the nurse arranges the dress and bed of the patient, and removes the paraphernalia of labor, as quickly and quietly as possible; the room should be darkened, the whole house maintained in as noiseless a condition as possible, and the patient urged to make a determined effort to obtain the rest which she so greatly needs. If she seem restless or excited, it is frequently good practice to administer at once a mild hypnotic, such as twenty to thirty grains of bromide.

The nurse should be ordered to remain in the next room, and forbidden to absent herself for a single minute from the sound of the patient's voice, that there may be no possibility of her failing to secure aid in case of faintness, secondary hæmorrhage, or any other emergency. A recently delivered woman so treated seldom sleeps profoundly, but will doze and rest for many hours; and has a vastly better chance of a normal and comfortable convalescence, than if she had been subjected to the congratulations and inquiries of bustling friends and relatives.

THE BINDER.—The use of the binder after confinement is in this country almost universal. It has been strongly objected to by some authorities, on the ground that the compression which it exerts tends to produce or favor the production of a low position, or even of a retroversion of the uterus; but though this objection is certainly valid if the binder is applied with injudicious tightness, it is, on the other hand, probable that a moderately snug bandage relieves the relaxed abdominal walls from the pressure of the abdominal viscera, and thus favors the necessary involution of the abdominal muscles, and, which is more important still, permits the patient to change her position freely and at will, without that risk of the entrance of air into the vagina or uterus which must otherwise always accompany the accidental assumption of Sims' position, in the relaxed condition of a recently delivered woman.

POSITION IN BED.—The position which the puerperal woman assumes in bed is unimportant, so long as it is frequently changed; but since many women from fear of injury persistently maintain a constrained position upon the back, unless distinct permission to move about is given them, the physician should be careful to inform each patient that she will rest better and convalesce more rapidly if, after the first few hours, she turn frequently from one position to another, provided that the perinæum is not lacerated; in which case, even, the nurse should be directed to frequently alter the position of the patient by passive motions; since few things are more unfavorable to physiological rest and to the progress of involution than the discomforts of an unvaried position; and every patient should be informed that the occasional assumption of a lateral decubitus is distinctly an advantage, on account of its tendency to promote free drainage of the accumulated lochia from the vagina.

POST-PARTUM CHILL.—A large proportion of patients are subject, within a few minutes of delivery, to a slight chill, which is especially frequent if the emergencies of the case have necessitated a somewhat free exposure of the person. The phenomenon is of no importance, and indeed is rather a favorable event than otherwise, since its occurrence distinctly lessens the chance of a post-partum hæmorrhage; but as it is likely to alarm the patient, care should be taken to inform her that it is a favorable rather than an unfavorable event.

AFTER-PAINS.—After-pains are due to a continuance of the intermittent contractions after the delivery of the child; they are therefore likely to be greatest after short and easy labors in which the contractility is only partially exhausted, and least after severe labors; for which reason they are comparatively rarely seen in primiparæ. They not infrequently occur in a thoroughly emptied uterus, they are always present when the uterine cavity contains clots or portions of placenta, and are to be distinguished from adventitious pelvic pains by their intermittent character. The *rationale* of their treatment consists in the adoption of measures intended to empty the uterus in order to secure its complete contraction, and in quieting the pain meantime. The first step in most cases should be the application of manual friction to the fundus of the uterus; if the size of the organ is such that it is supposed to contain a considerable quantity of clots, the friction should be followed by an effort at expression, after the manner of Credé; and when the uterus has been emptied in this way, the administration of a drachm of ergot, to which ten minims of laudanum has been added, will usually lessen and perhaps permanently stop the pain within a short time; but if the attack has been severe, retraction should be maintained by the continued use of ergot, in doses of from twenty to thirty minims, at intervals of from four to eight hours, for several days.

A useful and comforting additional treatment is the application to the lower portion of the abdomen of compresses wrung out of stinging hot water, and frequently changed. Gentle, intermittent faradization of the uterus may also be useful if a battery is at hand.

VENTILATION.—The popular impression of the extreme danger of "taking cold" during the first week of convalescence arises, without doubt, from the frequency with which septicæmia is ushered in by a chill, and from the mistaken pathology of former days, which ascribed its occurrence to an accidental exposure of the patient to a draught. In reality, nothing is more important, during convalescence from labor, than a free supply of fresh and fully oxygenated air; and it is the duty of the physician in all cases to be personally watchful lest the prejudices of the family, or monthly nurse, should expose the patient to the pernicious effects of a foul, ill-ventilated room.

CLEANLINESS.—It is a traditional belief that combing or brushing the hair of a woman during the first week of convalescence from labor exposes her to increased danger of hæmorrhage, a prejudice which probably arises from the fact that the muscular fatigue caused the patient by sitting up in bed to perform this duty herself would certainly predispose to such an occurrence; but careful arrangement of the hair by the nurse, without allowing the patient to rise in bed, can be productive of no harm, and should always be permitted and enjoined. The hands and face should be washed by the nurse at least twice daily; the body should be sponged from top to toe with tepid water at least once daily; in warm weather, and especially if the patient be stout, the groins, axillæ, and any other folds in the skin should be thickly dusted with baby powder.

ANÆMIA.—Many women, especially among the upper classes, are reduced during pregnancy to a condition of anæmia, which adds greatly to the exhaustion of the process of parturition, and leaves them in a condition peculiarly ill suited to sustain the fatigues and risks of the puerperal state. This condition, when present, should be steadily combated during pregnancy, though little more can be then hoped for than to arrest its progress; but during the puerperal period, much may be gained by a systematic administration of iron in full doses, as soon as the bowels have been moved; three excellent prescriptions for use at this time being the citrate of iron and quinine, the pil. ferri oxidat. saccharat. gr. v., and Austin Flint's saline chalybeate tablets.

If the expense of these preparations is of importance to the patient, the tincture of the chloride of iron should be prescribed in doses of fifteen to twenty minims three times daily, or the liq. ferri albuminatis; together with an early resort to a generous diet, and a moderate use of stimulants, preferably in the form of malt liquors, if these are not disagreeable to the patient.

ROUTINE OF TREATMENT DURING CONVALESCENCE.—During normal convalescence the physician should not only keep a record of the pulse and temperature, but should maintain a careful supervision of the five functions of defecation, micturition, establishment of the mammary secretion, the involution of the uterus, and the excretion of the lochia; since any abnormal alteration in the course of the puerperium is necessarily attended by a variation from the normal standard in at least one of these particulars. He should therefore, at every visit, examine the breasts; estimate the size, consistence, and tenderness of the uterus, by abdominal palpation of the fundus; inspect or inquire about the quantity and odor of the lochia, as collected upon the pads; and ask about the regularity of the bowels and urine.

DIET.—The digestion of the puerperal woman is, like all her functions, easily upset, and must be constantly watched. Her appetite is, during the first days of convalescence, usually absent, or at best slight, and even later is rarely large.

The diet should be light until the bowels have moved. During the first few days there is usually but little appetite, and a diet composed of eggs, milk, and gruel, in small quantities, is usually all that is wise; but it is generally well to administer a small amount of hot milk, flour gruel, or some similar substance as soon as the patient has become rested from the fatigues of labor. So soon as the bowels have moved and some little appetite appears, the diet should be gradually and cautiously increased at such a rate that before the end of the first week the patient is eating about as usual; but it must be remembered that throughout the puerperium the digestion is likely to be sensitive and easily upset. Indeed, throughout the whole lactation certain articles of diet must be avoided; the best rule being that fleshy vegetables, *i.e.*, those which are rich in starch, such as peas, beans, and potatoes, are not usually well borne, and should be taken in comparatively small quantities; that fruit should be used sparingly, and all uncooked vegetables positively forbidden; in addition to which it is a general rule that highly colored vegetables are seldom fit food for nursing women.

BOWELS.—The bowels ordinarily fail to move spontaneously during the first few days after delivery, and should be opened by a cathartic upon the second, third, or fourth day; the variation being dependent upon the general condition of the patient, and the early or late disappearance of the tenderness due to the distention and contusion of the vulva during delivery. Overlong neglect of this function after labor leads with certainty to the occurrence of headache and the other symptoms familiar to every one as the result of a temporary constipation; a condition which, during the puerperium, is often attended by an elevation of temperature, which is productive of discomfort to the patient, is distinctly likely to retard her convalescence, and predisposes to the appearance of hæmorrhoids. An over-prompt evacuation of the enormous amount of fæces which has often been accumulated during the latter part of pregnancy frequently leads, upon the other hand, to considerable exhaustion, and may be extremely painful.

The administration of a cathartic should be preceded in most cases by an injection of from one to four ounces of olive oil, and the preferable method is the administration of small but repeated doses of some non-poisonous preparation. That which is perhaps the most generally satisfactory after labor is the officinal pil. rhei co., gr. v., repeated every three hours to a result, or, in case of a patient who objects to pills, the effervescing solution of the citrate of magnesia, a large wineglassful at a dose.

MICTURITION.—Retention of the urine, due to the altered shape of the previously expanded bladder, which is consequent upon the diminished size of the uterus, and to laxity of the abdominal walls, is extremely common during the first few days after delivery. The existence of a distended bladder predisposes strongly to the occurrence of post-partum hæmorrhage; since the still distensible uterus may easily be drawn upward and expanded by the attachment of its anterior wall to the posterior portion of the bladder; and it may, moreover, be productive of extreme discomfort and much loss of rest to the patient. Its relief by the catheter not only risks the introduction of lochia into the bladder, and the inception of septic cystitis with its long train of most annoying discomforts; but, in addition to this risk, if the use of the catheter is once begun, it must generally be continued for many days, while, if the patient can be encouraged to empty the bladder for the first time herself, micturition is commonly performed with ease thereafter.

The treatment to be recommended is that, in the absence of hæmorrhage, the patient should endure the discomfort due to distention of the bladder until it becomes extreme, and that she should then be placed upon a bed-pan, and encouraged in every possible way to pass her water herself. A hot compress should be placed over the supra-pubic region, she should be allowed to hear the sound of running water, and, if necessary, should be helped by the application of supra-pubic pressure from the hand of the nurse. She should not be allowed to rise or sit up in bed for the purpose, on account of the risk of secondary hæmorrhage which this involves; but many patients succeed in expelling their urine when they are turned upon the face, or allowed to assume the knee-chest position; and this procedure is, with tolerably strong patients, upon the whole, preferable to the use of the catheter.

BREASTS.—Disturbance or interruption of the action of the mammæ is, upon the whole, the most common complication of the puerperium; and their development should always be closely watched until the secretion is fully established. At the first visit after delivery, the breasts should be carefully examined by sight and touch, the presence or absence of colostrum ascertained, and the amount of breast tissue estimated and considered in connection with the constitution and physical condition of the mother; so that the physician may be enabled to form as accurate a judgment as possible of the patient's probable capacity as a wet-nurse.

If the nipples have not already been under observation, their condition should be noted; and if any treatment of them is likely to be necessary, it should be begun at once, without waiting for the establishment of the milk. In most cases the infusion of green tea in brandy, which was recommended for use during pregnancy, may be advantageously kept in constant contact with the nipples; and in primiparæ, it is often advisable to make a systematic attempt to increase the prominence of the nipples from the time when the patient first recovers from the fatigues of labor. This may often be effected by instructing the patient or nurse to pull them forward with the fingers in imitation of the action of the baby's mouth, remembering that a too constant handling may produce irritation; or, if necessary, they may be drawn forward by the use of gentle suction with the breast pump or by means of a hot bottle. If this latter method is selected, a six to eight ounce bottle should be thoroughly heated by filling it with hot water; when, if this is rapidly poured out, and the bottle quickly applied to the nipple, the condensation of the contained air, which occurs during the cooling of the bottle, exerts a quite considerable force of suction upon the nipple.

So soon as the initial period of rest is passed, the patient should be directed to give the breasts to the child in alternation, at intervals of six hours, until the secretion of the milk is established. This process tends to reflex stimulation of the uterus and promotion of its retraction; distinctly hastens and increases the secretion of the breasts; affords an excellent opportunity of teaching the child to nurse properly; supplies it, in most cases, with a certain amount of colostrum, which has a beneficial and slightly cathartic action; and may assist the efforts of the physician to ward off the administration to it, by the nurse or family, of castor oil, molasses and water, or other nostrums.

During the first forty-eight hours the child should receive nothing else than what it is able to obtain from the mother's breast; but if at the expiration of that time it becomes restless and seems dissatisfied, and the breasts are still unfilled, it may often be quieted, and probably benefited, by giving it one or two teaspoonfuls of slightly sweetened milk and water, in the proportion of one part of milk to three of water; the dose being repeated at intervals of from two to four hours.

With the appearance of the milk, the breasts increase rapidly in size, and frequently are so much swollen as to be distinctly painful; but if this disturbance occurs, it is usually promptly relieved by the application of a moderately firm breast bandage, such as is used in the treatment of threatened mammary abscesses; by massage of the breasts; and by the provocation of a moderate number of watery dejections with saline cathartics.

Until within the last few years it has been generally taught that this establishment of the milk was ordinarily attended by the appearance of moderate pyrexia, which should not, however, exceed a temperature of 100°.5 F.; but this so-called milk fever is so seldom seen when exact antiseptic precautions have been employed that it may be laid down as an accepted rule that, unless the discomfort of the patient from distention of the breasts is decidedly excessive, any pyrexia which may appear at this period is probably due to a mild degree of septic absorption, rather than to any process connected with the breasts.

So soon as any considerable quantity of milk appears in the breasts, the baby should be nursed at intervals of two hours; being applied to one breast only at each nursing, and using them in alternation: but unless the condition of the child is distinctly poor, its interests, as well as those of the mother, are usually best subserved by nursing it but once between the hours of ten P.M. and six in the morning; the advantage to the baby being the greater probability that it will obtain a satisfactory quality of milk if the mother's rest is undisturbed. If, as is common, the milk at this period flows spontaneously from the breast, the nipples must be covered by a light compress; which should preferably be made of linen cloth, and should never be so thick as to promote maceration of the nipples by the production of an unnecessary amount of warmth.

It should be an invariable rule of practice to require the patient to wash the nipples thoroughly with a saturated solution of borax in water, before each nursing; and it is extremely important that the compress should be changed sufficiently often to prevent souring of the exuded milk—an occurrence which is not only likely to disturb the digestion of the baby in the event of any carelessness in washing the nipples before nursing, but is also likely to originate a fermentation, which by extension along the ducts may provoke the formation of a mammary abscess.

New-born children often fail in their first attempts at nursing; and in such cases dependence should be placed on gentle and frequent repetition of the trials, rather than on a wearying persistence. The mother should be laid upon her side, supporting the baby's head on her upper arm in such a position that the nipple is exactly opposite its mouth, and so near to it that it has no tendency to fall out. If the nipple is flat, it should be drawn out by the fingers of the nurse or mother, or by the use of a hot bottle, before the child is applied to it; a few drops of milk should be pressed out of the ducts, and allowed to remain on the nipple, that the baby may get the taste of it; or a little moistened sugar may be placed in the same position for the same reason; occasionally a change of breasts may result in success. The child may sometimes be made to nurse by gently stroking one of its mastoid processes, while the nipple is in its mouth, it being a curious fact that the action of sucking is frequently induced within a few moments by this stimulation, whether the child is at the breast or not.

Should the nipple fall from the mouth, it should be at once replaced by the mother, who must give her whole attention to the process. The child should nurse as long as it seems heartily interested in the effort; but so soon as it begins to mouth the nipple, drops it repeatedly, or in any other way plays with it, it should at once be removed from the breast, for the reason that a longer continuance of nursing at such a time encourages a bad habit of dallying with the nipple, and not infrequently leads to the ingestion of air, and to consequent disturbances of digestion; in addition to which, such actions are almost infallible evidence that its appetite has been satisfied.

UTERUS.—The uterus should be constantly examined to ascertain its consistency, tenderness, and size from day to day.

During the first few hours after delivery the fundus is usually but a few inches above the symphysis, but by the end of twenty-four hours the retraction of the muscular fibres of the uterine ligaments usually raises the organ, so that the fundus is found at, or nearly at, the umbilicus. From that time on, under normal circumstances, there is a steady decrease in its size and a steady increase in its consistency, until, on or about the tenth day, the fundus can no longer be felt with ease through the abdominal wall, and is at last wholly below the level of the symphysis pubis. The progress of this process of involution should be observed from day to day, because subinvolution, or delay in the return of the genital apparatus to its normal state, is a complication which may be sufficient to indicate considerable alterations in the management of the convalescence. Under normal circumstances the uterus is a tender organ, and one which is rather unpleasantly sensitive to the touch during the first few days after delivery; but unless some inflammatory process is present, gentle handling does not cause severe pain.

LOCHIA.—The character of the lochia should be inquired about, or ascertained by inspection of the vulvar pad, at each visit, the points worthy of notice being its amount, color, and odor. During the first three or four days the lochia have a red color, and are usually sufficient to soak the pad more or less thoroughly in from six to eight hours. After the fourth or fifth day the discharge is faintly pinkish and much decreased in quantity, and by the end of ten days it should be scanty, of a grayish white or yellow color, and of a creamy consistence. Unduly long persistence of the red color may be due to the existence of small vaginal or cervical tears or to pelvic congestion; the reappearance of the red color after it has once been lost suggests the presence of a foreign body (*e.g.*, clots or portions of the placenta or membranes) in the uterus, subinvolution, or some malposition. A sudden decrease in the quantity of the lochia, or its total disappearance, suggests, according to the concomitant symptoms, either the appearance of sepsis or an occlusion of the internal os by retained clots or other substances.

Normal lochia have a peculiar, sickish odor, which should be made familiar to the nostrils by constant examinations of the napkins in normal cases. The appearance of a distinctly foul smell, or odor of decomposition, is always strong evidence of present or impending sepsis. A slightly stale odor may precede the appearance of foulness, and should lead to an investigation of its cause; but if the nurse is inefficient, it may not infrequently be due to partial decomposition of the lochia upon the outside of the vulva, or on the thighs, clothing, or bedding of the patient. The matter is, however, one of so much importance that the physician should be prepared to personally investigate any such suspicious symptom. When the lochia are suppressed, and sepsis can be excluded, hot cloths or poultices should be applied to the lower portion of the abdomen, and ergot should be given in the hope of stimulating the uterus into contraction and forcing it to expel the plug.

VISITS.—The number of visits which the physician should make during a normal convalescence is a matter upon which some difference of opinion obtains, but the majority of obstetricians agree that constant attendance during the first week is of the utmost advantage in forestalling and preventing the accidents and complications to which patients are at this period liable. It is the best plan to see every patient at the end of from eight to twelve hours after labor, and thereafter once daily until the establishment of the milk begins; she should then be seen once, twice, or even three times in each day, as the necessities of the case may make advisable, until the flow is well established; after which, in normal cases, a visit every second or third day is all that is necessary, and with a good nurse the intervals may be made much longer.

LENGTH OF THE PUERPERIUM.—The puerperium lasts until the involution of the uterus and adnexa is thoroughly completed, a process which usually consumes a full six weeks. During that period, any long continuance of the upright position imposes an undue strain on the uterine supports; since an unusually heavy uterus must be held in position by partly involuted and therefore somewhat lax and softened ligaments. This danger, however, decreases with the progress of involution, and an unduly long confinement to bed is distinctly productive of fatigue, discomfort, and loss of vigor; which is partly, no doubt, caused by the mental weariness due to its tedium and irksomeness, and partly by the loss of strength due to muscular inaction; in addition to this, it is certainly a fact that a somewhat scanty secretion of milk often increases when the patient is allowed to get up. Hence no rule can be laid down as to the precise length of time that must be spent in bed, but the period must vary in accordance with the physical state of the patient, and the necessities imposed upon her by her social condition.

The best average rule of practice is as follows: Among the poorer classes the patient should be kept in bed, or at least restrained from her ordinary work, for as near a period of two weeks as is possible; this being all that can usually be done among working women. Among the better classes, women of superior physique should be kept flat in bed until about the twelfth day, when, if the fundus of the uterus is no longer perceptible above the pubes, they may be allowed to assume a sitting position in bed for a few minutes, preferably during one meal; if no considerable fatigue, dizziness, or backache follows this effort, it may be repeated two or three times on the following day. The patient is then allowed to move herself from the bed to a lounge placed close beside it, and is afterward rolled away to another part of the room, while the bed is turned and aired; but is not permitted to sit up for more than fifteen minutes at a time, and is encouraged to maintain as nearly a horizontal posture as is comfortable during the remainder of the day. If no ill results follow this indulgence, she is permitted to sit up on the lounge for short periods with increasing frequency, and at the end of three weeks is allowed to walk from the bed to the lounge.

During the fourth week she is given the freedom of her room, and during the fifth goes down to one or more meals daily; she keeps within the house during the whole of the succeeding week, and then resumes her ordinary duties. If, however, circumstances make an earlier release desirable, in the majority of cases there is no great risk is permitting a somewhat greater freedom during the last three weeks. If involution is tardy or the general condition of the patient is poor, a much longer confinement to bed may be necessary or advisable; the golden rule being that every increase of freedom should be gradual; that the erect position should be assumed several times daily for periods of a few minutes, rather than once for a longer time; and that every fresh indulgence should be adopted tentatively, and stopped at the first sign of backache or fatigue. Cases so treated are undoubtedly less liable to subsequent gynæcological disease, and are better fitted to endure the fatigues of prolonged nursing, than are those who are encouraged to a more hasty resumption of the ordinary course of life.

CHAPTER XXIII.

THE NEW-BORN CHILD.

THE care of new-born infants in ordinary health falls necessarily within the province of the obstetrician, but it is by no means within the scope of a text-book upon obstetrics to deal with the management of the diseases of infancy and childhood; for which reason the present chapter will be limited strictly to the care of normal infants, and to those minor ailments which are likely to arise during the period when the mother still demands the attention of the physician, *i. c.*, during the first six weeks of the infant's life.

BATHS.—The baby should be bathed once daily in warm water, but the bath should not be given immediately after nursing. Until the cord has separated, the baby should be sponged, rather than placed in the water, since any moistening of the cord would interfere with its desiccation.

CARE OF THE FUNIS.—If the cord was originally dressed aseptically, and is afterward kept dry as long as it adheres, it ordinarily separates as a dry eschar, and without suppuration. If, however, from any cause, infection occurs, and the cord separates by suppuration, leaving a moist, ulcerated surface, this should be washed with warm water and dressed with dry (preferably sterilized) oxide of zinc or powdered starch. This dressing, if undisturbed, usually forms within a few hours a dry scab, which subsequently separates without trouble.

If the cord has been improperly cared for, septic absorption may occasionally occur, and in such a case the treatment indicated is its immediate sterilization by iodoform or powdered salicylic acid; but care must be exercised in the use of any antiseptics among new-born infants, on account of their feeble vitality and their greater liability to poisoning by absorption of the antiseptics.

Such a child should, further, be given from one to three drops of whiskey before each nursing, and every care should be taken to insure its procuring a proper amount of food; *i. e.*, the intervals of nursing should, if necessary, be shortened, and the child encouraged to remain at the breast as long as it can be persuaded to suck.

CLOTHING.[1]—The clothing of the infant should be loosely applied. The tight bandaging which some nurses affect, not only does harm by restraining the movements of the chest, but also tends to produce an injurious intra-abdominal pressure; which is not unlikely to result in the production of an umbilical or inguinal hernia, instead of preventing it, as it is intended to do.

RETENTION OF URINE AND FÆCES.—Mothers and nurses are frequently much alarmed at the supposed non-appearance of urine or fæces during the first few hours or days of the child's life. If the non-appearance of fæces has been definitely ascertained, it should always lead to an examination of the anus and rectum, in view of the possibility of an imperforate condition of the gut; but closure of the urethra is so extremely rare that true retention of urine is seldom or never seen, the fact being that the new-born infant secretes but little urine, and has usually emptied its bladder during the process of birth; so that if the child seems well, and the external meatus is properly formed, the family may be confidently assured that the absence of urine is purely temporary, and of no importance.

ICTERUS NEONATORUM.—Jaundice of the new-born infant is occasionally dependent upon structural lesions of the liver; it is then extremely intense, is associated with rapid emaciation, and presents the appearance of a serious disease, even to inexperienced eyes; but such cases are fortunately extremely rare. Upon the other hand, the minor degrees of icterus are quite frequent among poorly nourished infants, and especially among the children of the ill-fed immigrant population of our cities. This common affection is usually associated with a slight loss of weight, but is always temporary and of no importance, and demands no treatment.

WEIGHT OF THE CHILD.—During the first three to five days of its independent life, the child receives, and can absorb, but little nourishment. It usually loses several ounces of its birth-weight during the first few hours, by excretion of urine and fæces, and also probably undergoes a somewhat rapid metabolism during the process of adaptation to its new condition. The result is an almost universal initial loss of from three to ten ounces, large babies losing more in proportion than those whose original weight is less. By the end of from five to ten days, the child should normally regain its birth-weight, and, if well, should from that time gain steadily. This is so distinct a rule that a failure to gain, and more especially a loss of, weight, is, as a rule, at any period of infancy, the first and most significant sign of improper nourishment or of the existence of functional or organic derangements.

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[1] See page 113.

Nothing is more important in the care of infancy than daily weighing of the child. This should be done as nearly as possible at the same hour of the day, the most convenient time being immediately after the bath, and while the child is still naked. Even then some variation may occur, as the result of a difference in the amount of food ingested, and in the amount of urine and fæces excreted, day by day. The scales employed should register to ounces, and, if the circumstances of the parents permit, it is well to purchase a spring dial scale, such as that sold under the name of the "Standard family scale," to be devoted to the use of the baby. The process of weighing may be much facilitated by lashing to the top of the scale a shallow basket, in which the baby can be placed. The daily weight should be entered by the nurse upon a chart or piece of paper, and preserved for the inspection of the physician, beside the mother's temperature chart.

DIGESTIVE SYSTEM.—*Sprue.*—A frequent source of alarm to the mother and family is the appearance of white aphthous patches upon the infant's tongue and mouth; these patches are popularly known under the names of "thrush" and "sprue," and are in reality a low form of vegetable life which develops upon the buccal surfaces as the result of a fermentation which is dependent upon the use of a dirty bottle, of fermented milk, or other improper foods. The prophylaxis of the affection is evident. When present, it may usually be removed within a few days by scrubbing the inside of the mouth with a saturated solution of borax. The nurse should wrap a piece of soft linen tightly about her forefinger, should dip this in the solution, and carefully rub it upon the whole of the affected surface.

Regurgitation.—Infants which are being properly fed should regurgitate but little, if any, milk. Should this regurgitation be frequent or abundant, it is usually dependent either upon fermentation of the milk within the stomach, or upon too frequent or too abundant feeding; it may also be dependent upon an undue richness, or other improper composition, of the milk. If it is due to the first cause, it may usually be remedied by careful cleaning of the nipples and the mouth. If it is caused by an unduly rich milk, it should be treated by increasing the dilution of the food in bottle-fed babies, or by the administration, to nursing infants, of one or two teaspoonfuls of water immediately before putting them to the breast.

Bowels.—For the first few days of life, the child's dejections consist of dark green, tarry-like meconium, and then gradually assume the light yellow color, which is characteristic of the fæces of healthy infants. The bowels should move at least once daily; but the appearance of several dejections within twenty-four hours is of no importance, provided that the color and consistence remain normal. Frequency, in connection with a green color and a watery consistence, is usually an indication that the food is in some way unsuited to the digestion.

Constipation.—This should be treated by alteration of the food, if any impropriety can be detected in it; but if no such cause is found, it must be relieved by methods analogous to those used in adults. The rectum of the infant is so small that if injections are used they must be limited in quantity to, at most, one-half ounce of soapsuds and water. A better method is the introduction, within the anus, of a plug of pure castile soap of about the size and shape of a large bean. This is almost invariably efficacious and is not productive of discomfort, but, if frequently repeated, is liable to cause some slight irritation, and should then be replaced by a piece of molasses candy of similar size and shape. The bowels may also usually be moved by the administration, by the mouth, of a couple of drachms of sweet oil, or by one of the following prescriptions:

℞ Phillips' milk of magnesia.
S. Teaspoonful when needed.

Or,

℞ Ol. morrhuæ, ... ℥ iv.
Aq. calcis,
Syr. calcis lactophos., ... āā ℥ ij.
S. One-half teaspoonful three times daily.

Castor oil and similar cathartics should never be used.

Diarrhœa.—The amount and frequency of the dejections is of small importance during the first weeks of infancy; but when the character of the excreta changes from the normal color and consistence, and either assumes a greenish color or is filled with flecks of coagulated and undigested milk, it may be taken for granted that the food of the infant is unsuited to its needs. If the baby is breast fed, an analysis of the milk may disclose a deficiency in some one of its constituents, which may usually be remedied by an alteration of the diet of the mother; or an excessive richness, which may be compensated for by giving the baby a little water immediately before nursing. Bottle-fed infants may be treated by similar alterations of their food; but the diarrhœa of infants is so extensive a subject, and forms so large and important a part of all text-books on the diseases of children, that its further consideration must be omitted here.

NURSING.—During the first thirty-six hours after birth, the new-born infant requires little or no nourishment, and, if placed to the breast at intervals of six hours, will usually be satisfied with the small amount of colostrum which it obtains from the nipple. This not only satisfies the infant, and enables the physician to prevent the administration of catnip tea, sugar and water, and similar nostrums, but also draws out and prepares the nipple for its subsequent duties, stimulates the retraction and involution of the uterus, and has a distinct tendency to hasten the secretion of the milk; it should be continued until the milk appears in full force.

After the secretion is established, the infant should be applied to the breast regularly every two hours during the daytime for the first six weeks, and after that at intervals of three hours. Feeble children must be nursed several times at night, but vigorous infants should be taught from the start, in the interests of the mother, as well as in their own, to be content with but one nursing between ten at night and six in the morning.

If the milk makes its appearance late, the child should be fed occasionally after the second day with one to two teaspoonfuls of a mixture of cow's milk and water. It should be mixed in the proportion of one part of milk to three of water, and should be warmed and slightly sweetened, preferably with milk-sugar. A teat formed of a clean cloth loosely rolled up should be soaked in the milk and water and placed in the child's mouth at intervals of a few hours; thus furnishing it with the small quantity of nourishment which is necessary, and encouraging the idea that it must work for its living; it being a fact that the ordinary process of feeding babies with a teaspoon renders them unwilling to make the exertion of subsequent sucking from the breast. In determining the period at which preliminary feeding becomes necessary, no invariable rule should be employed, but the physician should be guided by the behavior of the child. Infants which sleep soundly and do not cry, should not be disturbed by the administration of unnecessary nourishment; but so soon as the baby becomes restless, is indisposed to sleep, and cries frequently, it should be soothed in the manner just described.

Many babies at first refuse to take the breast, and considerable patience is often necessary in teaching them. The mother should be made to assume a position in which she can comfortably support the head of the infant upon her arm, in such a way that its mouth is directly opposite the nipple. It should then be held so near the breast that the nipple has no tendency to fall from its mouth; but care should be taken that its nostrils are not in contact with the mother's skin, since no child can nurse successfully, unless it is able to respire freely through the nose. If the nipples are flat they must be drawn out by the fingers or by a hot bottle immediately before the child is applied to them; and if the milk does not flow freely, it should be brought to the surface of the nipple by stroking the breast with the fingers. If all other means fail, the child may occasionally be induced to suck by moistening the surface of the nipple with a syrup made of sugar and water. Patience, perseverance, and careful attention to details are essential to success in many cases.

If the secretion of milk is still deficient or unsatisfactory at the end of the second week, it may usually be considered as an established fact that the mother will prove to be incapable of nursing her child. In such a case, if circumstances permit, it is best for her to give up the idea of nursing, and turn over the child to a wet-nurse. Should this be impossible, it should be remembered that partial nursing is better than none at all, and that, as long as the mother's strength is not undermined by lactation, a child which is alternately nursed and fed from the bottle, has a better chance than one which is wholly bottle-fed.

Selection and Care of Wet-Nurses.—The important points in the selection of a wet nurse are: that she should be free from phthisis, syphilis, and other hereditary or constitutional diseases; that she should be in good general health, and possessed of breasts which yield an abundant quantity of good milk. Her baby should preferably be of about the same age as the foster child; and it is a point of considerable practical importance to make sure that the character of the woman, and her temper, are such as to permit of her forming a tolerable inmate of a respectable household.

The size of the breast is of less importance than the freedom with which the milk flows, and the quantity which can be obtained by a single emptying of the breast; small breasts with an abundance of glandular tissue being often the best organs. The woman should be carefully questioned as to her family and personal medical history, and her skin and mouth should be examined for evidences of syphilis; the physician who attended her during labor should, if possible, be questioned upon the same points. The breasts and nipples should be personally examined and she should be asked how recently she has nursed her baby. An applicant for such a position is particularly likely to state that her breasts have just been exhausted by her own baby; and as this may or may not be the case, the physician should not accept her until he has seen the breast in good condition, but should direct her to come again, at a time when she has been at least two hours without nursing. No wet-nurse should ever be engaged without inspection of her baby; since its condition and the record of its weight furnish the most valuable evidence obtainable of the quantity and quality of her milk, and because syphilis which has escaped detection in the mother may be unmistakably present in the child. If possible, some milk should be drawn from the breast and submitted to an expert for chemical and microscopical analysis.

No wet-nurse should be allowed to keep her own child in the house with her during her engagement, since it is practically certain that in such a case her own child will receive the lion's share of her breast milk; and it is almost invariably necessary that some member of the family should supervise her nursing of the foster-infant, at least during the early part of her residence—at once to prevent neglect and to insure a faithful observance of the rules of regularity and cleanliness on which the health of the infant is greatly dependent.

ARTIFICIAL FEEDING.—If a wet-nurse cannot be obtained, and the mother's milk has failed, the baby must be brought up upon the bottle. A plain three to four ounce bottle should be selected and furnished with a small nipple of black rubber. The hole in the end of the nipple should be neither so large that the baby obtains more milk than it can conveniently swallow, nor so small that it is obliged to work unduly hard. The patent nursing-bottles, furnished with a nipple attached to the bottle by rubber tubing, are abominations which should not be permitted to exist, and which invariably result in the production of diarrhœa and indigestion from the fact that it is impossible to keep such a tube properly cleaned. The use of a simple nipple makes it necessary that some one should hold the bottle while the baby feeds; but this is by no means a disadvantage, since it is highly important that the baby should be forced to take all the milk that its stomach can hold at one sitting; and that it should not be allowed to doze over its meal, and to feed by instalments, with insufficient intervals. Care should be taken to remove the nipple from the mouth and hold the bottle in the vertical position for a few seconds, at intervals of from two to three minutes, in order to permit the entrance of sufficient air to replace the milk which has been ingested; neglect of this precaution results in the failure of the baby to obtain milk without unnecessarily fatiguing exertions.

The amount of milk given at each nursing should be regulated by the size of the child, the best rule being that babies of average size require during the first week one ounce of milk at each feeding, and two ounces at the end of six weeks, which amounts should be slightly increased or diminished for unusually large or small infants.

The bottle should be carefully rinsed with cool, and then with scalding, water,[1] and should be further cleansed by shaking within it a quantity of rice suspended in water. It should then be rinsed out again and filled with clean water to which a little cooking soda has been added. The nipple should be thoroughly rinsed with cool water, and kept at the bottom of a tumbler filled with a weak solution of bicarbonate of soda.

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[1] If scalding water is used at first, it may result in coagulation of the milk, and the adhesion of minute particles to the bottle immediately after nursing.

The only proper substitute for woman's milk is the milk of the cow, which, however, must be assimilated to a woman's, by the addition of water and of a small quantity of grape or, better, milk sugar. During the first three weeks the mixture should be about one-fourth milk, and during the second three weeks one-third milk; but since cow's milk is usually acid, while woman's milk is alkaline, it is well that the nursing should contain one teaspoonful of lime-water; and to the mixture should be added sufficient sugar to give it a slightly sweet taste.

The mixed milk of a herd should be preferred to that of one cow, as being less likely to be affected by any change in the health or diet of the animal. The difficulty in obtaining fresh milk during the heat of summer in city practice leads some authorities to recommend the use of condensed milk under such circumstances; but if this is employed, the greatest care must be observed to prevent it from spoiling. It should be used in the proportion of one part of the condensed milk to nine parts of water.

An excellent substitute for breast milk is the mixture known as Meigs' mixture, which is described by Dr. Meigs in the following words: "One quart of milk is placed in a vessel (a tall, narrow pitcher is best), and after standing three hours the upper pint is slowly poured off. This contains the better part of the fat (cream); and when the child is to be fed, there should be mixed together three ounces of this milk, two ounces of lime-water, and three ounces of sugar water; which last must be made in the proportion of eighteen drachms of milk sugar to one pint of water." This makes eight ounces of food, which of course is much too large an amount for a young infant or one that is ill; if, then, the infant is young, only one to two ounces will be needed at each feeding, and only that quantity should be prepared.

Sterilization.—Whichever food is used may be rendered much less likely to disturb the infant by sterilization, which, so far from being an added labor, has been thought by most patients to whom I have recommended it to involve less trouble than that which is necessary for the preparation of each bottle by itself at the time when it is to be used. If the milk is to be sterilized, the patient should procure twelve bottles of suitable size, and each morning the bottles, after careful additional cleansing, should be filled with the mixture of milk, ready for use, with the exception of the lime-water; they should then be stopped with cotton wool and placed in an ordinary kitchen steamer or a special sterilizing apparatus, such as Arnold's automatic steam cooker. The milk should be subjected to the action of the hot steam for about twenty minutes, and then set aside in a cool place. When the child is to be fed, one bottle is warmed by immersion for a few minutes in hot water, the cork is removed, the lime-water is added,[1] and the nipple drawn over the mouth of the bottle, which is then ready for use.

Feeble infants are often much aided by partial predigestion of the milk; and this is best done by the use of Fairchild's peptonizing tubes, which should be used in accordance with the printed directions that accompany them. The mixture should have been previously sterilized, and, when sufficiently peptonized, should be kept upon ice until it is used, in order to prevent further digestion.

A little salt should always be added to the food employed, and no food other than milk should ever be given to an infant during the first six weeks of its existence.

Passage of Drugs through the Milk. No rule has as yet been established by which it can be judged with any certainty whether a given substance will affect the baby by passing through the mother's milk. Some few drugs are known to diffuse themselves readily in this way; and of others it is known that they seldom or never pass; the remainder are uncertain, and their diffusion or not is probably largely dependent upon the idiosyncrasies of the individual woman. Salicylic acid, iodine, potassium, and atropia usually affect the baby when administered to the mother; mercury, mineral acids, opium, and chloral seldom or never can be perceived in the milk.

DERMATITIS NEONATORUM.—The skin of the new-born infant has been, during the whole development of the embryo, immersed in water and protected from maceration by its covering of greasy vernix. The abrupt transition to the external air not infrequently causes mild exfoliative dermatitis, which not infrequently causes much alarm to the mother and family, but passes off spontaneously within a few days if untreated.

MASTITIS NEONATORUM.—Many infants soon after birth are subject to a parenchymatous mastitis, which, oddly enough, is more common among boys than among girls. The swelling is sometimes considerable, the breasts are tender, and may exceptionally contain a milky substance. If not irritated by attempts to express milk or reduce the swelling by friction, they tend to disappear spontaneously, but, when so irritated, may result in a mastitis, or even in abscess formation and destruction of the gland. If the gland is hot, and especially if it is red, the application of poultices is to be recommended. If suppuration takes place, the abscess should be incised at a distance from the nipple.

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[1] If a mixture of milk and lime-water is subjected to heat it takes on a dirty brown color, which is due to an undesirable chemical alteration in the milk.

Ophthalmia Neonatorum.—The conjunctivæ of new-born infants are extremely prone to mild degrees of inflammation, which may be excited by sudden exposures to bright light or by contact with foreign substances, *e.g.*, soap; and these mild attacks may, by neglect, be converted into serious ophthalmias.

Contact with acrid vaginal secretions during birth, or more probably inoculation with the quiescent germs of a former gonorrhœa, may produce a most virulent ophthalmia, which is extremely dangerous to the eyes; so that, in lying-in hospitals it is the general custom to employ a routine instillation of a two-per-cent solution of nitrate of silver, one drop of which is inserted into each of the eyes of every new-born infant. This method of prophylaxis was originally introduced by Credé, and has resulted in a great decrease of purulent ophthalmias in institution work. It, however, results in the production, by chemical irritation, of a considerably increased number of mild catarrhal inflammations; and in private practice it is probably best to limit this precaution to cases in which the physician detects a purulent leucorrhœa during labor or has reason to suspect the probable previous existence of gonorrhœa in one or the other parent.

Slight catarrhal conjunctivitis with simply serous secretion is usually readily relieved by keeping the patient in a dark room, and by placing moist, cold compresses upon the eyes. These should consist of small squares of linen folded once, and should be changed at half-hourly intervals. Should the eyes fail to improve within a few days, a few drops of the following solution

℞ Sod. borat., ... gr. x.
Aq. camphoræ, ... ℥ i.
S. Collyrium.—One drop when needed.

should be placed upon the conjunctivæ several times daily. When the inflammation is so severe that the lids become swollen, and the secretion is in the least purulent, more heroic measures must be used. In many cases marked improvement appears within twenty-four hours if the lids are separated widely by the finger and thumb, and the eyes are cleansed by dropping tepid water upon them from a sponge held in the other hand, at least every fifteen minutes through the day, and as many times as possible at night. Should this fail, an instillation of from two to three drops of a two-per-cent solution of nitrate of silver with a dropper or small syringe should be administered at intervals of from once in twenty-four hours to once in six hours, according to the severity of the case. When improvement appears, the solution of borax in camphor water, given above, or a weak solution of corrosive sublimate (one grain to the pint of distilled water) should be substituted for the nitrate of silver; and if repeated with sufficient frequency may be all that is needed.

UMBILICAL VEGETATIONS.—These growths may be sessile, or pedunculated; vary in appearance from a soft, jelly-like body to the more common form of a hard, semi-fibrous protuberance; and may occasionally attain the size of a hickory-nut; they are not painful and seldom bleed. When pedunculated, they may be readily removed by ligaturing the pedicle; after which the growth may be snipped off with scissors, or may be left to separate by necrosis, after the arrest of circulation. In the sessile varieties, it may occasionally be necessary to preface the ligature by the passage of one or more needles through the base of the growth.

These tumors do not tend to recur, and their appearance is in no sense a serious matter.

UMBILICAL HÆMORRHAGE—HÆMATOPHILIA.—Hæmorrhage from the umbilicus may occur independently of marked hæmatophilia, as the result of a mechanical injury, such as forcible separation of the cord, and in such cases is readily arrested by compression or the application of styptics; but if the latter be used, great care should be taken to prevent irritation of the tender skin of the infant in the immediate neighborhood of the navel.

Hæmatophilia, the more common cause of these hæmorrhages, is a disease of the blood, the exact nature of which is not understood. It is especially common in infants, and results in bleeding from the umbilicus, and from any or all of the mucous surfaces. In severe cases the whole body may be covered with petechiæ. When the hæmorrhage is confined to the umbilicus, an attempt should be made to arrest it by pressure or styptics; but if the bleeding is due to hæmatophilia, this is seldom succesful. When the disease is more general, the prognosis is extremely grave, and no treatment is of much avail; though the administration of one-drop doses of dialyzed iron should always be given a trial.

CEPHALHÆMATOMATA.—These tumors are formed by effusion of the blood between the skull and scalp, and are probably due to a rupture of small blood-vessels by excessive overlapping of the bones during the process of birth. The tumor yields an indistinct sense of fluctuation, and, if untreated, never suppurates, but undergoes a spontaneous process of absorption, in the course of which quite a perceptible ring of bone is deposited around the edge of the extravasations. This ring of bone gradually spreads inward, and results in the formation of a slightly thickened spot upon the skull, which thickening may be perceptible on close examination for many years. Cephalhæmatoma are not perceptible at birth, but appear within the first few hours of extra-uterine life, and last about a month.

MALFORMATIONS OF THE HEART.—Malformations of the heart or of the great vessels may be due to their deficient development or to the persistence after birth of normal fœtal conditions. An early arrest of the development of these important organs is seldom compatible with life. The only forms of late arrest of development which are sufficiently common to be worthy of notice are, deficient development of the inter-ventricular or inter-auricular septa; either the ductus arteriosus or foramen ovale may fail to close during the first few days of life. All of these malformations result in a persistence of the fœtal circulation. Their causation is obscure.

Symptoms.—Among the symptoms of an imperfect circulatory system, the most striking and invariable is cyanosis. The importance of this phenomenon is dependent upon its permanency. Transient cyanosis may be a result of asphyxia neonatorum, and is, moreover, common in otherwise healthy children during the first twenty-four to forty-eight hours after birth. It is most marked in the hands and feet, is probably due to a partial persistence of the fœtal circulation, and disappears spontaneously. The affected parts are cold to the touch, and should be kept warmly wrapped; no other treatment is needed. Persistent blueness is almost invariably the result of cardiac malformations. The transient affection usually appears within a few minutes or hours of birth. Cyanosis which is dependent upon organic lesions appears in the majority of cases during the first week, and usually within the first twenty-four hours; but in a large minority it is absent until some weeks or even many years of normal life have supervened, and is then usually first observed after some exciting effort or in some debilitated condition. Such cyanosis is usually liable to an occasional paroxysmal increase, and is accompanied by an increased radiation of heat, tendency to dyspnœa, palpitation, and occasionally hæmatophilia. Such individuals usually maintain a somewhat feeble existence until attacked by an intercurrent disease, but are then likely to succumb to extremely mild attacks.

Treatment.—The treatment should be mainly hygienic. The clothing must be warm, any exposure to draughts or other forms of cold must be carefully avoided, all excitements absolutely interdicted, and the diet watched with especial care. The only medicinal treatment which can possibly be of value is the moderate use of alcoholic stimulants, the occasional administration of digitalis, and a resort to hot mustard foot-baths; and the exhibition of oxygen, during the paroxysms.

MALFORMATIONS OF THE LUNGS.—Deficient development of the lungs or of the lesser branches of the pulmonary arteries may result in deficient oxygenization of the blood and feeble health. An ante-mortem diagnosis is but rarely possible. Some few cases have been reported in which a structural defect in the diaphragm was followed, after a few good inspirations, by diaphragmatic hernia of the lungs into the abdominal cavity, failure of respiration, and death.

Atelectasis Neonatorum.—Closely akin to non-development of the lungs is the atelectasis of the new-born. This may be due to the plugging of important bronchi by inspired mucus, or to the child's failure to fully inflate its lungs after delivery. It is to be prevented by thorough clearing of the fauces with the little finger before inspiration occurs, and by care to make the child cry loudly immediately after its birth. When atelectasis has occurred, its presence is evidenced by the absence of the respiratory murmur over the affected portion of the lungs. It is to be treated by stimulating respiration by any of the methods recommended for use in asphyxia neonatorum, aided by the temporary support of life by the use of oxygen if necessary.

SUPERNUMERARY DIGITS.—Extra fingers and toes are abnormalities of not uncommon occurrence. Such digits may be attached to special supernumerary metacarpal or metatarsal bones, or may be attached by skin only. When extra metacarpal or metatarsal bones are present, they should be removed with the finger or toe by a set amputation. When the abnormal member is attached by skin and connective tissues only, it may be snipped off with scissors, or allowed to separate by necrosis, after ligature of its pedicle with a thread. In either case, the amputation should be performed within a few weeks of birth, since it is then far less likely to leave a permanent scar than if deferred to a later period.

CHAPTER XXIV.

CARE OF PREMATURE INFANTS.

PROGNOSIS.—Children born before the end of the twenty-ninth week seldom survive; but since the almost uniform loss of life at slightly earlier periods may, to some extent, be due to the want of care, engendered by a fixed belief in the non-survival of such infants, it should be a fixed rule that any child which breathes at birth should be treated as though it were viable. The chances of survival of an individual child depend mainly upon the degree of development to which its internal organs have attained; and since this is more dependent upon the period of utero-gestation than upon the size or weight of the child, its chances of survival are more nearly proportional to the period of its birth than to any other circumstance.

The popular belief that eight-months children are less apt to live than those born after seven months of gestation is wholly erroneous; except in so far as it is founded upon the fact that eight-months children seldom receive the care which is given to those born a month earlier. If, however, the attendants remember that the life of a fairly well-nourished and approximately mature-looking infant of eight months is as much dependent upon scrupulous and painstaking care as is that of a feeble fœtus born four weeks earlier, and accordingly give to it the same minute attention, the proportion of survivals among the former will be much the greater.

The usual method of death is either by the sudden appearance of a convulsion, which often comes entirely without warning, or by a progressive asthenia, evidenced by restlessness, refusal to swallow, and the production of a peculiar intermittent moan with each inspiration.

If the life of a premature infant is preserved until the natural time of term arrives, and till an increase in its weight and strength appears, its chances of prolonged life are, in most cases, in no way inferior to those of infants born at full time.

NURSE.—The three essentials in the care of all premature infants are: careful maintenance of the body heat; reduction of the exhaustion caused by passive motions, *i.e.*, by handling, to a minimum; and a supply of proper food, given in small quantities and at correspondingly short intervals. The details which are necessary to the attainment of these objects are, however, so numerous that few premature children survive without the advantage of having an intelligent attendant who is especially devoted to their care and has no other duties; for which reason, an effort to secure such a person should be the first and most essential step in treatment.

The nurse, when provided, should be impressed with the undoubted fact that, although the chances for the child improve with every day of its survival, there is yet no safety until it has attained the full period of nine months from conception; nor then, until it begins to show a substantial gain in weight and strength; but that, on the contrary, up to that time the slightest indiscretion may cause the sudden death of an infant which had previously done exceptionally well.

SEVEN-MONTHS CHILDREN.—Seven-months children should not be washed nor dressed, and should never be subjected to the fatigue of nursing. If such an infant is asphyxiated at birth, its resuscitation should be trusted, mainly, to immersion in hot water with the least possible use of the cold plunge; since the abstraction of heat by, and the considerable use of, cold water is almost necessarily fatal by shock; while the handling involved in efforts at artificial respiration is necessarily attended by an amount of exhaustion which must seriously compromise its chances. As soon as respiration has been established, such children must be wrapped at once in previously well-warmed cotton-batting or flannels; and the further arrangements for preservation of heat, which are to be shortly described, must be at once inaugurated.

EIGHT-MONTHS CHILDREN.—Fairly well-developed and vigorous children at eight months may be rapidly washed in warm water, with the least possible amount of handling, loosely and quickly dressed, and at once placed under the proper conditions for the preservation of their heat.

Seven-months children must be artificially fed, preferably with the mother's milk, for many weeks, or until the gain of strength is so far apparent that the muscular exertion of nursing is, in the opinion of the physician, within their powers. Eight-months children, if vigorous, may be put to the breast so soon as the milk appears; but all premature infants must begin to receive nourishment within a few hours after birth, and must be fed or nursed at short intervals, on account of the small amount of nourishment which the capacity of their stomach permits them to ingest at a single feeding.

MAINTENANCE OF BODY HEAT.—If no better means can be provided, the lives of many premature infants may be saved by a careful supervision of such simple preparations as can be made in any household. A large basket should be thickly lined with heated blankets or other flannels. A number of bottles filled with very hot water should be so arranged around the sides of the receptacle that they can be removed and reinserted without disturbance of the infant. The child is wholly covered, with the exception of its face, with well-warmed cotton-batting, and is laid between the bottles; and the cradle is then covered with a thick blanket, a space at the end which corresponds to the child's head being left open to permit the entrance of air. A thermometer should be laid beside the child; and one or more of the bottles should be refilled with hot water whenever the temperature is seen to fall below 87° F. The water should not, on the other hand, be so hot as to raise the temperature of the contained air much above 90° F. It will easily be seen that the attention necessary to secure this small range of temperature is extremely fatiguing, but with proper care such uniformity is possible; and if the other details of treatment are equally well carried out, it will usually save the life of the child.

Incubators.—When the circumstances permit, much trouble may be saved and better results are upon the whole obtained by the use of the specially devised incubators; among which Tarnier's and Credé's may be taken to represent the two types which have been most successful. Credé's has the advantage of cheapness and simplicity of manufacture. It requires more constant attention than need be given to the Tarnier apparatus, and has been at the same time less successful. The experience of the Boston Lying-in Hospital, in which a modification of this arrangement has been used for many years, shows that the mortality which it yields becomes extremely high with every at-

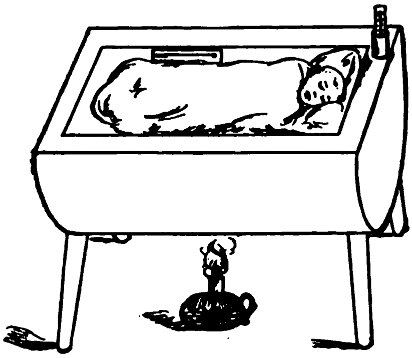
FIG. 107.—CREDÉ'S INCUBATOR.

tempt that is made to reduce the amount of attention given to it. Credé's apparatus (Fig. 107) consists of a tub or cradle of tin or copper, made with double walls and floor. The space between the walls is filled with heated water, the tub is lined with flannel or cotton-batting, and the child, separately wrapped in the same material, is laid in the middle of the whole, and covered with a blanket. A thermometer is laid alongside the child, and another is passed between the walls through a hole left for the purpose so that its bulb is in the water. Uniformity of heat is attained in the original apparatus by drawing off a portion of the water through a stop-cock, and replacing it with fresh, boiling water; in the apparatus shown in the illustration, by raising or lowering the gas-jet underneath. In the use of any such open apparatus, it is a matter of great importance to maintain a high and approximately uniform temperature of the room in which it stands.

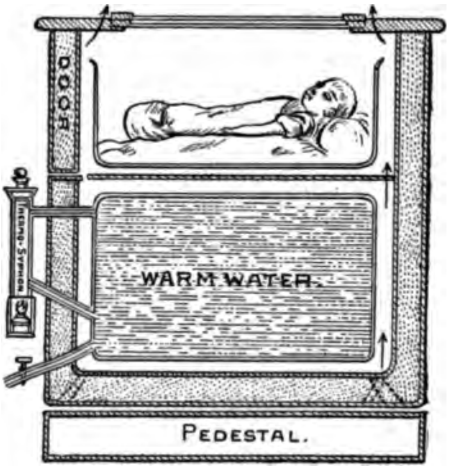

FIG. 108.—TARNIER'S INCUBATOR.

Tarnier's incubator (Fig. 108) consists of a wooden box with double walls 0.10 to 0.12 centimetres thick, and filled in with sawdust to prevent loss of heat. A central partition divides the box into two compartments, the one for hot water, the other for the infant's cradle. A metal case, of a capacity of about seventy-one litres, fits into the lower compartment, leaving a space of two to three centimetres, between its walls and those of the box, for the free circulation of air from below upward. The capacity of the upper compartment is about eighty-six cubic centimetres; there is free circulation of air between it and the lower compartment, and it is in communication with the outer air by means of two openings: the one on its upper surface is shut in by a double plate of glass; the other opens laterally like a door, to afford an exit for the cradle. In each corner of this upper compartment there is a hole for the escape of the heated air from below. To the lower compartment, containing the hot water, a thermometer is attached by an upper and lower tube. When the lamp under this siphon is lighted, the heated water flows through the upper tube into the chamber, displacing an equal amount of water, which flows back into the siphon; thus a current is established, the temperature of which can be raised to the desired point. In cold weather it has been found necessary to light the lamp three times daily, allowing it to burn each time about two hours. The lamp should be extinguished when the temperature in the lower compartment is about two degrees above the heat desired. The thermometer which registers this should be laid alongside the infant. The temperature should be maintained as near 90° F. as possible, 87° to 90° F. being the extreme limits which are permissible. The children should be wrapped in cotton or loosely clothed, according to their age; the wrapping should be so arranged that the napkins can be changed from five to six times daily, without further disturbance of the infant, which should never be lifted from the incubator except for nursing, when that is permitted. At the Paris Maternité one-third of all the children of less than four and a half pounds weight have been saved of late years, while at Leipsic the total mortality has been reduced to 18%; but in comparing these results it must be noted that the Leipsic statistics include children up to six pounds.

Feeding of Premature Infants.—During the first twenty-four hours it is rarely necessary to administer to the child anything more than a little brandy, two minims of which should be given in from ten to twenty minims of warm water every two hours. It should afterward be fed with a medicine-dropper or by gavage, two to three fluid drachms of the mother's milk being introduced into the stomach every hour. If for any reason the mother's milk cannot be employed, that of a wet-nurse, or properly diluted, peptonized cow's milk, should be used. The method by which the food is administered is of great importance; a premature infant at first swallows with difficulty, and, if the food be given by a teaspoon, much of it usually escapes through the lips. The prepared milk should be placed in the medicine-dropper; the tip of the tube should be passed into the child's mouth, close to the base of its tongue; and the milk expressed, drop by drop; this process being repeated until the required quantity has been given. If this method is successful, it may be employed throughout; but if the milk is, even when so given, regurgitated, in part or whole, Tarnier's plan of gavage should be employed.

Gavage.—The infant is taken upon the lap, its head being slightly raised, and a soft-rubber urethral catheter, No. 14 to 16 French, is moistened and introduced into the mouth, and permitted to pass down the œsophagus by the child's efforts of deglutition. The milk is then poured slowly into a small glass funnel, which is inserted into the upper end of the catheter, till one or two drachms have been introduced into the stomach, when the catheter is withdrawn by a single quick motion, since its slow removal is usually followed by vomiting. If too large a quantity of nutriment is administered in this way, the child may apparently increase in size and weight; but this increase is largely due to œdema, which, if allowed to persist, must always result fatally. Two to three fluid drachms is usually well borne, unless by the smallest infants.

When a seven-months child is four weeks old, it may be dressed and allowed to nurse; but, in any case, all the other precautions must be scrupulously observed in their full rigor until the calculated time of term is passed, and until the gain in weight and strength which is appropriate to that time begins to appear.

CHAPTER XXV.

HÆMORRHAGES. PELVIC COMPLICATIONS OF THE CONVALESCENCE. INTERCURRENT DISEASES.

SECONDARY HÆMORRHAGE.—The term post-partum hæmorrhage is usually limited to a loss of blood within the first two hours after delivery. Any later flooding is known under the name of secondary hæmorrhage. Such secondary bleeding is commonly announced either by the patient's perception of the escape of blood, or by sudden faintness upon her part. It must not be forgotten that occlusion of the internal os by a clot, and subsequent concealed hæmorrhage within the uterus, is by no means unknown; so that any sudden faintness during the puerperium should lead to an immediate determination of the size of the uterus by palpation. The treatment of secondary hæmorrhage is in all respects similar to that of post-partum hæmorrhage. The uterus should be immediately emptied by expression, or by the internal use of the hand; contraction and retraction should be secured by friction over the fundus, the use of hot-water injections, etc., and maintained by guarding the fundus with the hand and by the use of ergot.

PLACENTA SUCCENTURIATA.—It occasionally happens during the development of the placenta that a few chorionic villi at a distance from the placental site persist, develop, and form an auxiliary or so-called succenturiate placenta; in which case the elementary chorionic vessels which connect the two placentæ also persist and join the umbilical vessels. In such cases it usually happens that the succenturiate placenta is torn away from the membranes and left *in utero* during the third stage of labor: an occurrence which can usually be diagnosticated by examination of the membranes by transmitted light, when, if the placenta succenturiata exists, it will be seen that large vessels pass off through the membranes, from the circumference of the main placenta, and terminate abruptly in torn extremities. If such vessels are found, their existence is a quite sufficient indication for an intra-uterine search for a subsidiary after-birth. The presence of such a body in the uterus usually results in the production of a secondary hæmorrhage after a variable period.

The bleeding is partly due to its detachment from its uterine site, and partly to the distention of the uterus by a foreign body.

Treatment.—The immediate removal of the succenturiate is the only rational treatment. The method should be that which would be adopted in retention of the normal placenta. When secondary hæmorrhage occurs, the possible existence of a placenta succenturiata should always be remembered, and the uterine cavity should be thoroughly explored for such a body after the removal of the clots which are almost invariably found.

FIBROID TUMORS.—*Diagnosis.*—Submucous sessile fibroids may give rise during the first few days of the puerperium to no other appearances than an undue size and firmness of the uterus, but become apparent later, on bimanual examination and the use of the sound, owing to the fact that the involution of the uterus is more rapid and complete than that of the tumor. The other varieties are easily appreciated by palpation immediately after labor, by reason of the irregular contour which they give to the organ.

Prognosis.—The dangers which their presence involves are those of secondary hæmorrhage, and septic absorption from possible sloughing of the tumor by the decrease of circulation due to the process of involution. The lochia in such cases may be increased and prolonged by hæmorrhage due to the tumors, which is especially frequent in the pedunculated, submucous varieties, or they may occasionally be scanty and almost without color. Hæmorrhage, if it occurs, is usually slight, but is exhausting from its long continuance. Sloughing results in the production of a mass of necrosed tissue situated over a thin spot in the uterine wall. It exposes the patient to the danger of septic absorption, and even of rupture of the uterus, during any intra-uterine manipulations that may be undertaken.

Treatment.—The treatment of hæmorrhage due to fibroids must consist in ordinary cases of a systematic administration of ergot: but in case of failure to check the flow by the use of this drug, and of the continuance of the hæmorrhage to a point at which the loss of strength becomes serious, the gentle use of the blunt wire curette, under full antiseptic precautions, to be followed if necessary by an intra-uterine application of Churchill's tincture of iodine, or of diluted Monsel's solution, may result in at least a temporary arrest of the bleeding. The further progress of the case should then be conducted upon the ordinary principles laid down in text-books on gynæcology.

When a fibroid is found to be present and a foul uterine discharge appears, the possibility that sloughing of the tumor is taking place becomes so great that an intra-uterine examination by the finger should be made, when, if a broken-down condition of the tumor is found, it should be removed as gently as possible by a cautious and gentle, but thorough and prolonged, use of the blunt wire curette; it being remembered that the uterine wall at the site of the tumor is probably thin, and is, moreover, often softened by an extension of the necrotic process; and that the greatest care must be used to prevent opening the peritoneal cavity by a too forcible use of the instrument.

VULVO-VAGINAL THROMBOSIS.—The accident is caused by a submucous rupture of one or more veins, from the increased venous pressure of labor. The return of the blood from the pelvis is prevented by the occlusion of the veins under the pressure of the advancing head during the second stage of labor. If the walls of the veins are weak, the increased pressure may be followed by their rupture and an effusion of the blood into any of the submucous spaces of the pelvis, but the most common site of this accident is behind or at the side of the vagina, in the immediate neighborhood of the vulva; from whence the effusion may extend upward through the connective tissues below the pelvic diaphragm, or outward under the superficial fascia of the perinæum, groins, or, exceptionally, the abdomen and thighs. Thrombosis may also occur, though very rarely, in the substance of the cervix.

If the rupture occurs early in the second stage, and is followed by an immediate effusion of blood, the tumor may be detected during labor, and may often be sufficient to constitute an obstruction to the descent of the head; but in many cases the effusion does not take place until after delivery, and the condition remains unsuspected until pain or collapse attracts attention to the possibility of its occurrence. It may appear at any time during the first twelve hours of the puerperium. The condition may terminate in (1) immediate death from loss of blood without rupture of the tumor; (2) in death by external hæmorrhage after bursting of the tumor, which may be the result of simple rupture or of the sloughing of its walls from pressure; (3) in septicæmia due to sloughing, or to suppuration or necrosis of its contents, without rupture; (4) in recovery, either by spontaneous absorption of the effused blood, or by union of the surfaces of the cavity by granulation after its evacuation.

Diagnosis.—The symptoms which suggest this accident are the appearance of a sudden and severe pain at the side of the vulva, more or less severe collapse without external loss of blood, and, on examination, the presence of an elastic tumor either in the cervix or behind one or the other labium. If the tumor contain fluid blood, it will yield a more or less distinct fluctuation, but after coagulation has occurred it has a somewhat boggy feel.

Treatment.—If the tumor is found during labor and is not large enough to cause a serious obstruction to the advance of the head, immediate delivery by forceps is indicated; if, however, the tumor when first discovered is so large as to prevent the advance of the head, its surface should be incised, the clots rapidly turned out, and the head immediately extracted. This, however, should not be done until the materials necessary for the control of the resulting hæmorrhage have been placed in readiness. Immediate delivery is indicated in either case; because the pressure of the head necessarily produces venous stasis, and thus favors the increase of the tumor. This same pressure is, however, sufficient to prevent any immediately serious loss of blood, for which reason no flooding need be apprehended until after the delivery of the child. After delivery, in such cases, the remainder of the treatment is precisely similar to that which should be adopted when the incision is made at the time of election.

If the tumor is only discovered after labor, or if the delivery of the head without incision is possible, it is best to quiet pain by the administration of opiates; to enjoin absolute quiet in bed, and the avoidance of all straining efforts (for which reason the urine should be drawn by the catheter during the first forty-eight hours); to make persistent use of ice poultices, or of the pressure of a colpeurynter inserted into the vagina and filled with iced water, in the hope of restraining further hæmorrhage, and permitting the absorption of the effused blood, since this is the most favorable termination possible, and its attainment is often possible if the tumor is small.

The case should be carefully watched, and examined at least daily; at the first sign of sloughing, as shown by discoloration or vesication of the surface of the affected labium, or of suppuration as evidenced by the return of fluctuation, the tumor should be incised. It is better to wait for the advent of these symptoms, not only on account of the chance of absorption, but because an earlier evacuation of the cavity is likely to be followed by a severe hæmorrhage, for which reason it is better to wait until the vessels have become plugged by clots. After the appearance of suppuration or sloughing, no delay should be permitted, since any further delay can but increase the danger of septic absorption.

When interference has been decided upon, a good assistant should be procured, the patient should be placed in the lithotomy position, a plentiful supply of properly prepared absorbent material and a quantity of Monsel's solution diluted to the color of sherry wine should be placed at hand. The tumor should be opened by an incision of from two to three inches in length along the inner surface of the labium; the clot should be rapidly turned out, and the cavity syringed with an antiseptic solution; if hæmorrhage occurs, it should be controlled by making pressure on the walls of the cavity with a wad of gauze or absorbent cotton which has been wrung out in the diluted Monsel's solution. It should then be distended by packing it with small pledgets of the absorbent material which have been previously treated with iodoform or with a strong solution of creolin; the latter being the better, since it is equally efficient as a styptic and deodorizer, and on account of the by no means small danger of iodoform poisoning which attends upon the use of the latter drug in recent enclosed wounds.

The packing should be removed at the end of not more than twenty-four hours, and the cavity should be washed out and repacked. Absolute rest in bed should be enjoined, all action of the bowels should be prevented by the use of opiates, and the urine drawn by a catheter.

The diet should be mainly composed of liquids, and of those solid substances which are likely to produce the least amount of fæces, but should always be sustaining, in view of the exhausting effects of the inevitable loss of blood and possible sepsis.

PELVIC COMPLICATIONS OF THE CONVALESCENCE.—This subject has been almost universally neglected in text-books upon obstetrics, being probably considered unworthy of notice, and a part of the domain of gynæcology; but the prevention of subsequent pelvic disease is no inconsiderable portion of the obstetrician's duty, and the subject of minor pelvic complications arising in the absence of sepsis is of immediate and practical every-day importance in the management of labor. In speaking of these accidents as independent of sepsis, it must, however, be stated that, although they frequently occur without well-marked septicæmia, they are probably, in fact, always due either to the recurrence of a previous local trouble caused by the strains and contusions of labor, or to a mild degree of septic absorption which is sufficient to cause local inflammation, although not enough to cause a general systemic infection.

Subinvolution.—Subinvolution may affect the uterus, vagina, uterine ligaments, and abdominal walls. The delay may be caused by any inflammatory process, of which septic inflammations are by far the most common; or may be due to the inability of the ligaments and walls to undergo their normal retraction, owing to the constant strain imposed upon them by a too early assumption of the erect position. It may result, when untreated, in the production of a chronic pelvic congestion, or in any of the uterine malpositions.

It is rarely detected before the completion of the first ten days, *Treatment.*—If the tumor is fu large enough to cause a serious ob head, immediate delivery by forc the tumor when first discovered is vance of the head, its surface shoul turned out, and the head immedi ever, should not be done until th control of the resulting hæmorrha ness. Immediate delivery is indicat pressure of the head necessarily pro favors the increase of the tumor. ever, sufficient to prevent any imm for which reason no flooding need the delivery of the child. After d mainder of the treatment is pre should be adopted when the inc election.

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When interference has been should be procured, the patient s position, a plentiful supply of p terial and a quantity of Monsel's sherry wine should be placed at opened by an incision of from

pain after a greater or lesser length of time.
condition should consist in the application of
though not excessive, support by a properly
increased duration of the period of confine-
quick friction of the abdomen; massage; and,
faradization as already described, but if sub-
pelvic organs is absent, the positive electrode
to the abdominal muscles near their origins or

THE UTERUS.—Malpositions of the uterus
bined with subinvolution, and seldom cause
portance unless so complicated.
after delivery, the uterus normally occupies a
derable prolapse and marked anteversion, and
wenty-four hours rises to about its normal posi-
of muscular retraction, in which the ligaments
with the uterus; but is then so large and heavy
falls about from side to side as the woman moves.
if no other, restraint to the dorsal position is in-
the strain upon the uterine supports which results
bitus is not unlikely to result in a relaxed condi-
and of the upper portions of the broad liga-
thus initiate the production of a posterior mal-
also the over-tight application of a binder may
production of a partial prolapse, with or without
When either of these displacements has existed
gnancy, it is almost certain to recur unless pre-
hanical treatment; but if such treatment is adopted
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reappearance of the red color of the lochia; and
t important, upon bimanual examination.
xistence of such a condition is suspected, the patient
mined during the latter part of the second week,
essary of suitable size should be adjusted if a pro-
version is found; but owing to the fact that the
expected to rapidly decrease in size, the examina-
repeated at intervals of a few days, and the pes-
constantly reduced in size, *pari passu*, with the
the passage. The upper limb of the pessary must
unusual length, in order to prevent the production
on, which is likely to occur if the heavy fundus is

partly from the inherent conditions of the case, partly because the necessity for the observance of antiseptic precautions renders it unwise to institute a vaginal examination before that time. If, however, at any period during the puerperium or convalescence, the characteristic symptoms of heat, sense of weight and dragging in the pelvis, return of the red color to the lochia, backache, and indefined pelvic pains appear, a careful examination should be made; and if the pelvic organs are found to be large, soft, and sagging, treatment should be at once instituted.

Treatment.—This should usually consist of the use of hot-water douches, given in quantities of one to six quarts, the patient lying upon her back with her hips somewhat elevated; the water should be injected from a douche-pan or fountain syringe, under the force of a hydrostatic pressure of not more than two or three feet, at a temperature of from 100° to 110° F.; the quantity of water and the degree of heat being graduated to just the amount which is productive of a sense of comfort, rather than of fatigue, to the patient. If, as occasionally happens, the use of hot-water douches is followed, in spite of all care, by fatigue, headaches, or exhaustion, they should be discontiued, and the bi-daily insertion of small tampons soaked in equal parts of glycerin and water should be employed instead. In case these means fail, and a careful bimanual examination demonstrates the absence of any localized inflammatory condition, the use of faradic electricity is sometimes beneficial. The negative pole should be attached to a large abdominal electrode while the positive is passed into the vagina; an extremely weak current should be used at first, and should be gradually increased to the highest point which is borne without discomfort; maintained at that maximum for a few moments, and as gradually decreased, the whole séance lasting no longer than ten minutes. The application should be repeated on every second or third day, glycerin tampons being used in the intervals.

The use of ergot in the treatment of subinvolution has been enthusiastically advocated and as warmly condemned. Its possession of any power of initiating and stimulating the process is extremely doubtful; but it is undoubtedly useful as an adjuvant to other means. It may be given in a fluid extract, 20 to 30 minims, three to four times daily, or in two-grain ergotin pills with the same frequency.

Subinvolution of the abdominal walls is most common after great distention, as in the case of twin pregnancy or hydramnios, and in multiparæ. It is important, as being the chief element in determining loss of figure, a matter of no small interest to most women, and also because the alteration of the intra-abdominal pressures due to a pendulous abdomen usually results in the production of pelvic pain after a greater or lesser length of time. Treatment of this condition should consist in the application of constant and firm, though not excessive, support by a properly adjusted binder; in increased duration of the period of confinement to bed; light, quick friction of the abdomen; massage; and, in occasional cases, faradization as already described, but if subinvolution of the pelvic organs is absent, the positive electrode should be applied to the abdominal muscles near their origins or insertion.

Malpositions of the Uterus.—Malpositions of the uterus are usually combined with subinvolution, and seldom cause symptoms of importance unless so complicated.

Immediately after delivery, the uterus normally occupies a position of considerable prolapse and marked anteversion, and during the first twenty-four hours rises to about its normal position by a process of muscular retraction, in which the ligaments partake equally with the uterus; but is then so large and heavy that its fundus falls about from side to side as the woman moves. For this reason, if no other, restraint to the dorsal position is inadvisable, since the strain upon the uterine supports which results from this decubitus is not unlikely to result in a relaxed condition of the round and of the upper portions of the broad ligaments, and may thus initiate the production of a posterior malposition. So also the over-tight application of a binder may result in the production of a partial prolapse, with or without retroversion. When either of these displacements has existed previous to pregnancy, it is almost certain to recur unless prevented by mechanical treatment; but if such treatment is adopted during the later portion of the puerperium, the displacement may often be permanently cured, instead of being simply relieved, as is unfortunately so often the case at other times.

The diagnosis of malpositions of the uterus must depend upon the previous history of the patient; upon the appearance of pain in the back, groins, or hips, not permantly relieved by rest in bed; the reappearance of the red color of the lochia; and finally, and most important, upon bimanual examination.

When the existence of such a condition is suspected, the patient should be examined during the latter part of the second week, and a Hodge pessary of suitable size should be adjusted if a prolapse or retroversion is found; but owing to the fact that the vagina may be expected to rapidly decrease in size, the examination should be repeated at intervals of a few days, and the pessary should be constantly reduced in size, *pari passu*, with the involution of the passage. The upper limb of the pessary must generally be of unusual length, in order to prevent the production of a retroflexion, which is likely to occur if the heavy fundus is unsupported and the pressure of the pessary is directed against the middle portion of the still soft and flexible uterus. The pessaries sold under the name of "patent process" are usually the most convenient for this purpose, from the fact that they can be readily moulded to suit the individual case.

CELLULITIS.—Diffuse inflammation of the connective tissues of the broad ligaments, and of the other spaces in the pelvis (accompanied or not by salpingitis), is usually of septic origin; it is, however, not very infrequent in aseptically conducted labors, as the result of the contusion of old inflammatory deposits during labor, but is then probably more likely to occur if these injuries were originally due to sepsis.

The symptoms which should lead to a suspicion of such a condition are the appearance of a slight rise in temperature and pulse, accompanied by pain and tenderness on one or both sides. The tenderness is usually less well marked over the uterine body, but is increased by passive motion of the fundus. Any such train of symptoms should invariably lead to a careful bimanual examination. If a cellulitis is found, the treatment should consist of the administration of saline cathartics in small and repeated doses, unless the pain be so severe as to require opiates; the application of poultices over the lower portion of the abdomen; and rest in bed. In non-septic cases this course of treatment usually results in resolution of the phlegmon within a few days.

CYSTITIS.—Cystitis during convalescence from labor is usually due to the introduction of lochia into the bladder during catheterization, though a mild vesical irritation may follow a too constant use of the catheter. When cysititis has appeared, the use of the catheter should be avoided so far as possible; opiates should be freely administered, preferably in suppositories; diuretics and demulcent drinks, such as elix. buchu et pot. acet. (N.F.), acetate of potash (gr. xx. in a half-tumbler of water), lithia and Apollinaris water, etc., should be taken frequently and in large quantities; and in severe cases the bladder should be washed out once or twice daily, in the hope of arresting the disease. This is most conveniently done by attaching a full-sized silver or elastic webbing catheter to the tube of a fountain syringe; a saturated solution of borax being generally the best fluid. The bag of the syringe should be so suspended that the free surface of the solution is not more than twelve to fifteen inches above the pubes of the patient; the catheter should be passed and the urine withdrawn; the instrument should then be attached to the tube of the syringe, care being taken that neither the catheter nor syringe contains any air, and the fluid allowed to flow into the bladder until a sense of fulness or discomfort is complained of. At the first indication of this condition, the connection between the catheter and syringe should be broken, and the injected fluid should be expelled by the patient. This process should be repeated, if necessary, on several successive days; and may often be followed, with advantage, by the introduction of from five to ten grains of iodoform suspended in the solution of borax, and injected through the catheter with a small syringe after the withdrawal of all but a small quantity of the previously injected fluid; or, if it be preferred, the iodoform may be incorporated into a small gelatin bougie, which can be introduced into the urethra, and then urged into the bladder by pressure upon it through the anterior vaginal wall.

HÆMORRHOIDS.—Hæmorrhoids are not an uncommon complication of the convalescence, and are often productive of great discomfort. Treatment should consist in securing free daily movements of the bowels; in the application of the ung. gall. et op.; and the local use of hot-water compresses; or of ice poultices, constructed by mixing ice, broken to the size of a walnut, with a sufficient quantity of Indian, rye, or other coarse meal.

INTERCURRENT DISEASES.—*Pneumonia.*—It is probable that there is a somewhat increased liability to acute lobar pneumonia during the convalescence from labor; when it occurs the pyrexia is apt to be rather high. The prognosis is rather worse than that of pneumonia in general. It is not infrequently associated with a general septic infection, in which case the prognosis is distinctly bad. The treatment is that of pneumonia.

Scarlet Fever.—Scarlatina was formerly confused with the erythematous eruptions which are not infrequent accompaniments of septic infection, and was then considered an extremely common complication of the convalescence; it is in fact infrequent. It may be contracted by a puerpera either by the ordinary infection localized mainly in the throat, or through a contamination of the fresh wounds in the genital tract by the pathognomonic germs of the disease. When the affection is vaginal, the stage of incubation is shortened, averaging from twenty-four to forty-eight hours. The rash is most marked in the neighborhood of the vulva, and the appearances which are familiar in the throat, *i.e.*, redness, swelling, and pseudo-diphtheritic patches, are found in the vagina. The diagnosis is to be made from a known exposure to the disease, and the appearance of the rash; it is sometimes impossible until after desquamation occurs. The disease is not infrequently attended by inflammatory pelvic complications. Its prognosis is that of scarlet fever in general, modified by the prognosis of any pelvic complications which may be present.

Erysipelas.—Whether erysipelas is or is not identical with sepsis is still a matter of discussion among bacteriologists, but practically the question is unimportant, since it is universally admitted that the erysipelas is to be prevented by strict asepsis, and that when it is present its treatment is identical with that of sepsis.

Diphtheria.—The relation of diphtheria to sepsis is identical with that of erysipelas.

Malaria.—An increased liability to malaria during the puerperium is generally admitted, and patients who have already been subject to paroxysms of intermittent fever are almost invariably afflicted by its recurrence at this period. The type of the disease is occasionally extremely severe, but is ordinarily somewhat light; its treatment is unaffected.

Acute Articular Rheumatism.—A somewhat increased liability to this disease has been alleged, but it is possible that this belief is due to a confusion between septic arthritis and rheumatism.

Delirium Tremens.—Labor, like pneumonia and fractures, may be followed in drunkards by an attack of delirium tremens, which, on account of the exalted nervous susceptibility of the puerpera, is usually severe. The treatment should consist of forced feeding, and a moderate use of the bromides and chloral. If circumstances render it possible, the patient should be left untied in bed, but should be prevented from leaving her bed by the constant presence of a trained attendant. The delusions of delirium tremens are invariably those of terror, and a nurse who agrees with the hallucination, and promises protection, is usually successful in quieting the patient; bromide and chloral should be used sparingly. The prognosis of the affection when it once exists is extremely grave, but if the habits of the patient are such that an attack is apprehended, it may often be averted by the administration of moderate doses of liquor from the moment of delivery; after it is once present, the expediency of giving alcohol is doubtful.

DISEASES OF THE URINARY SYSTEM.—The urine of a puerpera is normally increased, both in quantity and in its percentage of solid constituents; that is, the kidneys are required to perform an increased amount of work during the convalescence from labor: there is, consequently, an *à priori* probability that any previous renal disease will be subject to an increase of severity at this time, and that such an increase does occur has been substantiated by clinical experience. Chronic nephritis is not infrequently first detected at this time, but it is probable that, in most of such cases, the disease has been of long standing, although previously undetected.

Septic infection through the lower urethra, and the introduction of foul lochia into the bladder by instrumental means, may result in inflammations of any or all portions of the urinary tract. Partial or complete occlusion of the ureters may follow upon the bruising of prolonged or operative labors.

CHAPTER XXVI.

DISEASES OF THE BREASTS.

GALACTORRHŒA.

THE term galactorrhœa includes two forms of abnormality—the secretion of a pathologically large quantity of thin, watery milk, and persistence of the normal secretion after the removal of the baby from the breast. The first form may be very exhausting to the mother, almost invariably results in illness of the child if nursing is persisted in, and usually appears toward the end of a long lactation. The second form is less important but may be extremely annoying to the patient; it is usually seen in women who have been fine wet-nurses, after the death or removal of the baby.

In the first form, weaning of the child, a nutritious diet, the use of iron, complete rest, and light support of the breasts, usually cause the disappearance of the secretion. Atropia and its derivatives are best withheld, because their constitutional effect is seldom desirable for the mother.

In the second form the main reliance must be placed upon carefully adjusted and vigorous general pressure upon the breasts, in conjunction with the free use of saline cathartics or the continued administration of moderate doses of atropia; large, fleshy women with an abundant but not over-rich secretion being generally most benefited by saline derivation, while those of more spare build or less abundant secretion are best suited by the use of atropia. If pressure is necessary it may be applied by a breast bandage or the dressing of contractile collodion described under mammary abscesses.

DIMINISHED SECRETION OF MILK.—A diminution in either the quantity or quality of the milk is always dependent upon some deficiency in the general condition of the mother, and can be combated only by careful attention to the details of her general hygiene, by increase in the amount of fluids ingested, and a highly nutritious diet.

Chocolate, cocoa, the heavier beers, oatmeal porridge, eggs, and milk all enjoy a deservedly high reputation for the diet of nursing mothers; but to secure rest, freedom from care, from anxiety, and other emotional sources of disquiet, is frequently a much more important point in the treatment of the affection.

It must be remembered that a long lactation is no slight drain upon the vitality of many women; and that when the failure of the breasts is secondary to the exhaustion of unduly prolonged nursing, there is but little hope of building up the patient while the secretion continues. An inferior quality of milk is always injurious to the baby: and, in such cases, weaning should therefore be recommended and urged to the mother, in the interests of both patients, unless a wet-nurse can be provided.

SORE NIPPLES.

The painful and by no means innocuous lesions which are usually grouped together under this head occur most frequently in primiparæ, and especially in women whose nipples, from the pressure of corsets or other causes, have become flattened or otherwise deformed. They are best described under the heads of excoriation, fissure of the apex, and fissure of the base.

EXCORIATIONS.—Excoriation of the nipple is the result of a maceration of its delicate epithelial covering, produced by the constant flow of milk over its surface, when re-enforced by the friction of the baby's tongue and lips, during the act of nursing. It is especially common during the first weeks of lactation, and results in the production of a raw, papillated, strawberry-looking spot, which may be so large as to cover the greater part of the nipple. It is excruciatingly painful when touched, and frequently becomes covered, during the intervals between the nursings, with small scabs, the removal of which by the nurse, or by the act of nursing, may cause considerable discomfort and sometimes slight bleeding.

The affection, like all other forms of sore nipples, is of the greatest importance on account of the liability to septic absorption which it initiates, and of the danger of the formation of a parenchymatous abscess which consequently attends its existence. If allowed to become extensive and inflamed, it may form a most obstinate and annoying lesion; but if treated early, it may usually be relieved in from twenty-four to forty-eight hours.

Excoriations tend to heal rapidly if protected from maceration and mechanical irritation, which objects are to be attained by the use of some astringent application or by a temporary discontinuance of the rough handling which the nipple invariably receives from the baby's mouth. The applications most valuable for this purpose are powdered tannic acid, the compound tincture of benzoin, and the solid stick of nitrate of silver. If tannic acid is used, it should be spread thickly over the affected surface and covered by a bit of linen cloth slightly greased with vaselin to prevent sticking. The compound tincture of benzoin should be applied in several successive thin layers with a camel's-hair pencil after the nipple has been carefully dried by a soft bit of linen cloth. If nitrate of silver is used, the solid stick should be applied to the affected surface, but not until both the lesion and the surrounding skin have been carefully dried, since the moisture of the excoriated surface is abundantly sufficient for the purpose, and a too extensive application of the caustic may only result in an enlargement of the excoriation.

Tannic acid labors under the disadvantage that its use presupposes that nursing from that breast. is to be temporarily suspended, since the ingestion of the superfluous tannin from the nipple would almost certainly disturb the baby's digestion. If it is employed, the use of the affected breast must be replaced by the bottle, and the nurse must relieve the breast at the end of the usual interval, by milking it with the hand or by a careful use of the breast pump (Fig. 109); the difference to the breast between these processes and that of nursing being that the mechanical irritation of the nipple by the motion of the baby's tongue is done away with. If the nitrate of silver or the compound tincture of benzoin is used, it is, however, possible to continue the use of the affected breast by employing a proper nipple shield.

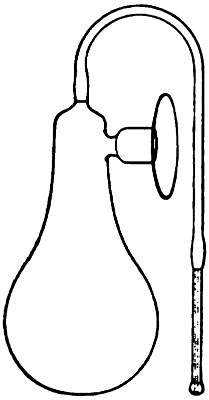

FIG. 109.—MRS. BAILEY'S BREAST PUMP.

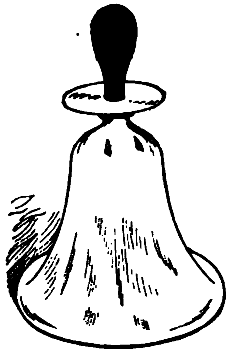

FIG. 110.—ACME NIPPLE SHIELD.

My own experience has been that the compound tincture of benzoin, in combination with a nipple shield, is, if employed early, a thoroughly satisfactory method of treatment for almost every case, and I cannot but believe that the many physicians who condemn the nipple shield upon the ground that it is refused by the baby owe their failures to a want of proper persistence in its use.

It certainly is a fact that most babies decline at first to nurse the shield; but if it is properly constructed, if it is tightly applied to the breast, and if after the shield is in position it is partly filled with milk expressed from the breast by the fingers of the nurse, a very little persistence in its use is almost always crowned with success. Much, however, depends upon the form of shield used; those furnished with a rubber tube should be unhesitatingly condemned, on account of the absolute impossibility of securing sufficiently exact cleanliness of the tube, and because of the certainty with which their use is followed by the appearance of sprue or of more serious digestive troubles. Two forms only are to be recommended—that known as the "Needham ('Mother, don't you cry')" and that sold under the name of the "Acme" (Fig. 110). The two are exactly alike in principle; but the Needham is made throughout of rubber and is somewhat more complicated than the Acme, which consists of a simple glass shield, to which the ordinary rubber nipple is directly attached. Either form must be taken apart after each nursing, throughly washed, and kept under water in a carefully cleaned tumbler.

Fissure of the Summit.—A fissure of the summit is an extension of the natural division between the papillæ; it is extremely painful, and gives rise to considerable bleeding during nursing. It is to be treated exactly in the manner just prescribed for excoriations, except that in this case the cauterization of the fissure by a finely pointed stick of nitrate of silver is distinctly preferable to either of the other applications.

Fissure of the Base.—Fissures of the base are crescentic cracks, which are usually situated on the under side of the nipple, at its conjunction with the areola. They are most often seen in women who have prominent and pendulous nipples, and are the result of a maceration, which is due to the warmth and moisture engendered by contact between the nipple and breast when pressed together by the weight of the nipple or by tightness of the clothing. They are to be treated by the application of the solid stick of nitrate of silver; followed by separation of the opposed surfaces by a small amount of absorbent cotton, and a temporary suspension of nursing or use of the nipple shield. After the surface has assumed a thoroughly healthful appearance, the compound tincture of benzoin may be applied to it, and is frequently extremely useful. The use of the nipple shield is advantageous in many cases, of doubtful utility in others. Its employment must be decided by observation of its effect upon the crack. In cases in which the pain during nursing is relieved by the use of the nipple shield, it is more beneficial than any other expedient at our command. In other cases, however, the crack is at least as fully opened when the shield is used as when the baby is placed directly upon the breast.

Fissures at the base of the nipple may be extremely obstinate lesions; and if in such cases they become irritated and inflamed, it may even be necessary to dry up the breast. This final course of action should not, however, be adopted until the formation of an abscess seems imminent. The necessity for the resort to so heroic a procedure may often be averted by a temporary suspension of nursing at a time when the trouble, though obstinate, is least threatening. If the nipple is sufficiently prominent to permit of the application of the dressing, a surprisingly rapid success may sometimes be attained by holding the surfaces of the crack in apposition with a dressing of collodion and absorbent cotton. A small bit of absorbent cotton should be drawn out into an extremely delicate web, the surface of the crack should be dusted with iodoform, and the nipple should be held in such a position that the crack is nearly closed. The web should then be laid over its surface, and fastened to the skin with a thin layer of flexible collodion. This should be allowed to dry, and repainted until a sufficiently thick layer has been obtained; another extremely thin web of absorbent cotton being added if necessary. In the treatment of all forms of sore nipples it must never be forgotten that the most scrupulous attention to cleanliness, a free use of vaselin to the skin, and the constant employment of such mild antiseptic solutions as can be safely employed in this situation, *e.g.*, a saturated solution of boracic acid, are factors of prime importance in the prevention of further trouble, and should never be neglected.

PHLEGMONS AND ABSCESSES OF THE BREAST.

A "broken breast," as it is popularly called, is a very tedious, painful, and exhausting disease, which, when threatened abscess is included in the description, may present itself in any degree of severity between the slightly hard and tender lump which is due to inspissated milk and is easily removed by massage, to a multilocular abscess which occupies the whole seat of the ruined gland and is filled with pus or broken-down connective tissue. It may appear at any stage of lactation, in any one of its three forms—*i.e.*, (1) as a superficial or supra-mammary abscess situated in the subcutaneous connective tissue which overlies the gland itself; (2) as a deep or submammary abscess, lying entirely beneath the gland, in the subcutaneous tissue which connects the organ to the pectoral muscles; and, (3) the most common form, as a parenchymatous mastitis of the gland itself, involving usually both the glandular and the interstitial connective tissues.

SUPERFICIAL ABSCESS.—Superficial abscesses are the result, invariably, of septic absorption by the superficial lymphatics, either from pimples on the neighboring skin or through the surface of simple erosions of the nipples or areolæ. In either case they are usually the result of a want of thorough surgical cleanliness in the care of the breast. They are seldom of large extent, are announced by the appearance of marked reddening of the skin, are quickly followed by superficial fluctuation, and attended by comparatively slight pain. They are promptly relieved by an early incision.

SUBMAMMARY ABSCESS.—Submammary abscesses, the least common of the three forms, are probably always caused by the burrowing of pus from small but deeply seated parenchymatous abscesses, which, though the source of the trouble, are usually of but slight importance as compared with the extensive abscess which follows the escape of the pus into the submammary tissues.

This form of mastitis is marked by a high temperature, and dull, deep-seated pain, an absence of redness of the skin, a tendency toward an extensive lymphatic engorgement of the axillæ, and marked pain on motion of the arm. As soon as any considerable amount of pus has been formed, the whole gland may be felt to move loosely over the subjacent tissues, and can frequently be perceived, by the finger, to rest, as it were, upon a fluid bed.

In the presence of such symptoms, and in the absence of any signs of superficial pus formation, the surrounding skin should be rendered thoroughly aseptic, the breast should be drawn strongly upward, and a medium-sized aspirating needle plunged deeply into the submammary space, in a direction which is parallel to the chest wall, at a point about over the lowest insertion of the pectoralis muscle. If pus is obtained, the abscess should be laid open by passing a director along the aspirating needle as a guide, and following it by a blunt-pointed bistoury or, preferably, by a slender sinus dilator, or pair of scissors, which, when once in position, is withdrawn in sufficient expansion to permit the introduction of the index finger through the wound. Every effort should then be made to discover the, frequently small, opening of the parenchymatous abscess which was probably the source of the trouble. When an opening is found, it should be enlarged by the finger, any broken-down tissue which may exist should be thoroughly scraped off, the whole of the cavity syringed out with a one to sixty solution of creolin or a one to one thousand solution of corrosive, a large drainage tube inserted, and an antiseptic dressing applied, exactly as is done in parenchymatous mastitis.

PARENCHYMATOUS MASTITIS.—*Etiology and Prognosis.*—This variety of abscess includes within itself the great majority of all broken breasts; it always involves, in the end, both the interstitial and glandular tissues, but may originate in either of two ways, the distinction being a matter of considerable clinical importance. The abscess may begin as a small phlegmon of the connective tissue, entirely unconnected with the acini or ducts; in which case it is always due to septic absorption from a sore nipple or from the small pimples or boils which are not very infrequent in the areolæ. It may, upon the other hand, take its origin from an inspissation of milk in a given duct or acinus; in which case the subsequent suppuration is due to an irritation of the gland, which is excited from the presence within it of a mass of cheesy or curdled milk, which acts upon the epithelium as a foreign body. This plugging of the acinus may be due to a fermentation of the contained milk, caused by the entrance of some one of the ordinary forms of bacteria into the lactiferous ducts, and their passage backward to the gland; and, though it is now an extreme heresy to admit the possibility of a non-parasitic origin for such diseases, I cannot help believing that it is sometimes due to an inspissation from simple thickening of the milk. This might well occur in so active a gland as a result of a local congestion of the secreting epithelium, which was itself caused by the accidental irritation of a slight blow, an exposure of the breast to a draught of cold air, or some similar contingency; and I am, in consequence, accustomed to direct my patients to observe the utmost care to avoid such accidents and exposures. Whatever the cause may be, at least it is a clinical fact that the threatened abscess which first appears as a hard, localized, tender, but not excessively painful lump, and which is not attended by any marked reddenng of the skin, but is accompanied by a sharp exacerbation of temperature, may usually be promptly relieved, if treated early, by massage and the subsequent application of a pressure bandage; while those which begin as an ill-defined but painful spot situated behind a sore nipple or a pimple of the areola, which are attended by an early redness and œdema of the overlying skin and in most cases by a very gradual rise of temperature, should be subjected to the ordinary surgical treatment of phlegmon in any other situation, and are much more often followed by suppuration, in spite of the most careful treatment. The most dangerous cases are those in which the original lesion in the nipple or areola is angry and inflamed, while the secondary infection is slow, insidious in its approach, and attended by but a slight accession of temperature, and few local symptoms.

Treatment.—The treatment of parenchymatous mastitis is divided into the observance of prophylaxis; the employment of expedients to avert suppuration, so long as that is possible; and, in the event of its occurrence, a prompt and thorough use of the knife.

Under prophylaxis must be ranked a careful watchfulness over the condition of the nipple, the strict observance of cleanliness, a free use of vaselin to the nipple and areola, and the constant employment of the utmost possible antisepsis throughout the whole course of lactation.

When a distinct threatening is present, the choice between the different methods of conservative treatment which aim to avert suppuration, must always be complicated by the question whether or not there is still a reasonable hope that the function of the breast can be preserved; or whether the probability of an eventual suppuration is already so great as to entirely outweigh the misfortune of an early termination of the activity of the gland, which must certainly follow upon the adoption of the more vigorous and safer modes of treatment.

Whatever may be the form of lesion under consideration, the first essential point in its treatment is the immediate removal of the baby from the breast, and the promotion of entire surgical rest of the organ until pain and tenderness have entirely disappeared or have at least become insignificant. This being done, success in the management of these cases depends upon an intelligent choice of the measures to be employed, and upon a scrupulously careful attention to the details of the technique, which in doubtful cases should be conducted by the physician in person, rather than left to the care of the nurse.

When the trouble is thought to be due to inspissation of milk within the gland, the expedients at our disposal are the use of massage and of properly applied pressure, together with, in the earliest stages, an attempt at relief of the congestion which is certainly present, by the derivative action of saline cathartics, and perhaps by a mild counter-irritation of the neighboring skin. When it is thought to originate in the connective tissues, the use of salines, and of ice, or hot poultices; and the attainment of absolute surgical rest, by the application of a bandage for support but not for pressure, are the means of treatment indicated.

TREATMENT OF ABSCESSES WHICH ORIGINATE IN INSPISSATION OF THE MILK.—*Massage of the Breast.*—The whole skin of the affected breast should first be rendered slippery by the application of some emollient; for which purpose, camphorated oil is preferred by many physicians. The operator should begin by a gentle and rapidly repeated superficial stroking motion with the finger tips (Fig. 111); each stroke of the hand beginning with the finger tips placed well outside the edge of the breast and terminating at the nipple. The motions should be made to cover the whole surface of the breast, in successive portions, though special attention should, of course, be paid to the affected spot; should be so gentle as to cause no pain; and should increase in force as a tolerance of deeper friction appears. When quite firm massage is but slightly, or not at all, painful to the patient, the affected lump should be pressed upon by the flat of the hand, and urged gently but firmly away from the edge of the breast and toward the nipple (Fig. 112), for a few moments, when thick milk is usually seen to flow from the mouth of the duct which subtends the lump. When this pressure becomes painful to the patient, as it usually does within a few minutes, it should be replaced by a repetition of the stroking movements; and the process should be repeated until the whole gland has become soft and flaccid, or the operator fears the patient is becoming exhausted, or until the tenderness begins to reappear. The whole breast should then be encompassed by a carefully adjusted pressure bandage, which, to be efficient, must be one of those designed especially for the purpose.

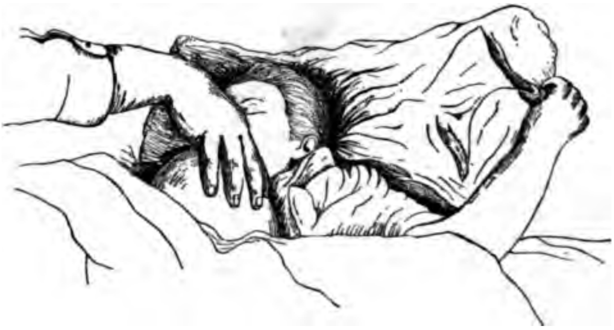

FIG. 111.—FIRST MOTION IN MASSAGE OF THE BREASTS.

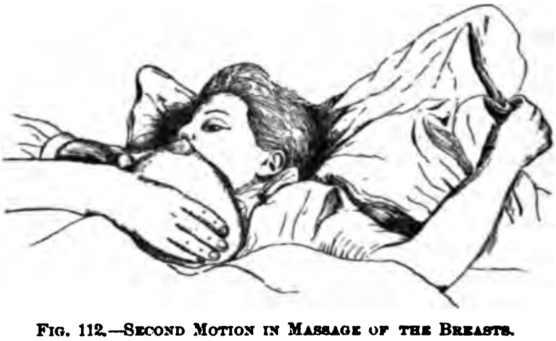

FIG. 112.—SECOND MOTION IN MASSAGE OF THE BREASTS.

Breast Bandages.—Of the various binders which have been devised for the purpose, that used in the New York Maternity (Fig. 113) excels in simplicity, and provides adequate compression. It is cut from a piece of stout linen cloth after the pattern given in the figure, the dotted lines representing the outlines of the finished binder; and is applied by placing it under the patient with the line AB lying against her spinal column; the bottom corners, C,C, are then pinned tightly together across her chest, well below the edge of the breasts, which are drawn upward and inward by the hands of the patient during the remainder of the process of application. A piece of wadding is placed between the breasts, and the edges C D are then pinned together as tightly as possible, from below upward, when E,E and F,F are pinned together across the shoulders, to prevent slipping of the bandage (Fig. 114).

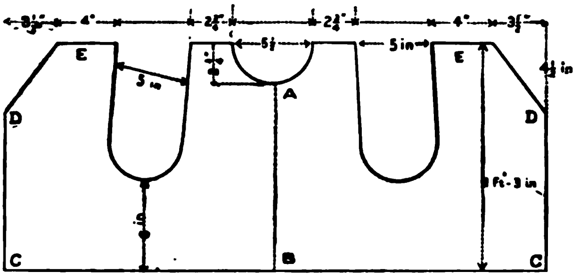

FIG. 113.—PATTERN OF BREAST BANDAGE USED IN THE NEW YORK MATERNITY HOSPITAL.

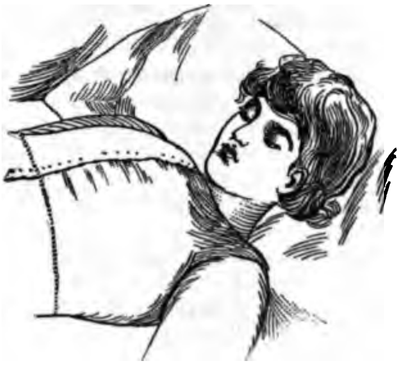

FIG. 114.—BREAST BANDAGE OF THE NEW YORK MATERNITY HOSPITAL IN POSITION.

This bandage, however admirable in other respects, is distinctly inferior to that which has been used for many years in the Boston Lying-in Hospital, in the fact that it subjects the nipples to unnecessary and perhaps injurious pressure, and that it must be removed whenever nursing is permitted or when the breasts are to be emptied by other means.

The Lying-in Hospital bandage (Fig. 115) may be easily extemporized by fastening together, in the shape of a T, two strips of very stout linen cloth; of which that which forms the tail of the T should be about four inches broad and sufficiently long to a little more than half encircle the patient's chest; while the crosspiece should be nearly double the length, and sufficiently wide to extend from a position an inch below the edge of the patient's breasts to the edge of areola.

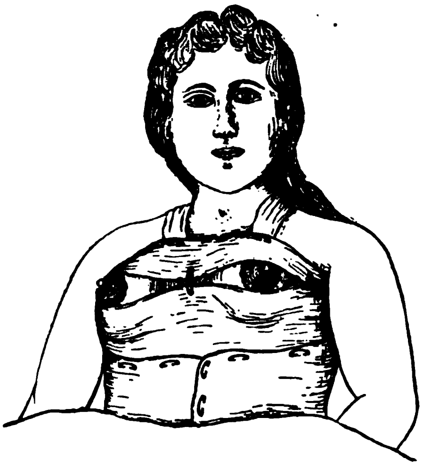

FIG. 115.—BREAST BANDAGE USED IN THE BOSTON LYING-IN HOSPITAL.

This bandage is applied by drawing the tail of the T beneath the patient's back, in such a position that its ends appear at the sides upon a line with the nipples, and with the junction of the tails well external to the edge of the breast on that side. The lower edge of the lower half of the crossbar should then be drawn tightly across the chest, care being taken to see that it is below the lower edge of the glandular tissue; it is secured by a safety-pin to the free end of the tail piece, and is prevented from slipping upward by attaching it to the upper edge of the binder, at two points, which should be opposite the most dependent parts of the breasts. The upper edge of the other tail is then drawn across the chest, entirely above the breasts, is pinned to the other corner of the free end of the tailpiece, and prevented from slipping downward by a piece of cloth, not more than two inches wide, which is pinned to it at two points, each of which is opposite the upper edge of the corresponding breast, and is then carried over the shoulder, and attached to the crosspiece in the middle of the back. The whole surface of the breast should then be thoroughly dusted with powdered starch or some similar neutral powder, and a large wad of absorbent cotton is placed between them. The breasts are then drawn strongly inward by the hands of the patient, and the bandages pinned together on each side over the axillæ, beginning at the outer angle and thence working upward toward the nipple, care being taken that the pressure is uniform, except that, so far as possible, it decreases gradually from the axillæ to the areolæ. The upper edges of both strips should then be brought together between the breasts with safety-pins; when the bandage should present the appearance shown in the figure, and should exercise a perfectly smooth pressure upon every part of the gland.

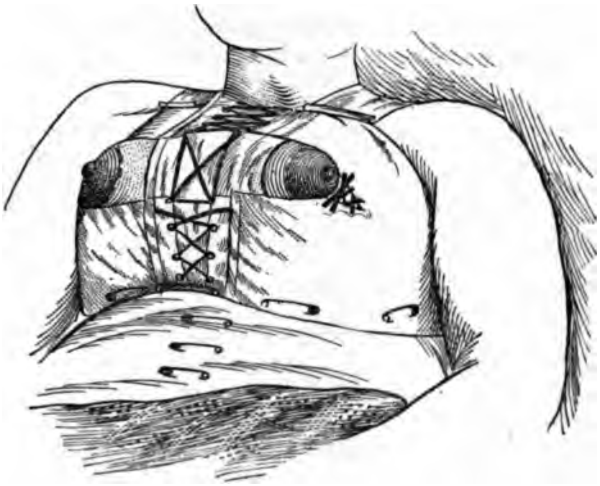

FIG. 116.—DR. CHADBOURNE'S BREAST BANDAGE.

When circumstances permit, the application of the bandage may be simplified, and its efficiency promoted, by the use of the device shown in Fig. 116, which was recently invented by Dr. A. P. Chadbourne, late house physician to the Boston Lying-in Hospital. It cannot be readily extemporized, and is somewhat expensive, but is rather more comfortable to the patient, and decidedly neater looking. Its size must be proportionate to the size of the individual patient, and should be supplemented by shoulder straps, as in the ordinary bandage.

When either of these bandages is being used to exert pressure upon a badly caked breast, it should be drawn as tightly as is possible without seriously embarrassing the patient's respiration; its pressure then almost invariably results in the expression of all the milk which the glands contain, but produces so much discomfort that it must usually be loosened at the expiration of a few hours. Its use should, however, be continued, under a lighter tension, until the patient has been free from trouble for some days.

It may also be employed to great advantage for the support of pendulous or heavy breasts, or for the relief of the engorgement which frequently attends the first appearance of the milk; but when used for this purpose, it should be much less tightly drawn.

Contractile Collodion.—When the trouble is so serious that it is thought necessary to dry up the breasts at once, and when somewhat marked discomfort is of but slight importance in comparison with a prompt attainment of the most efficient compression possible, the most excellent results are often obtained by covering the breasts with a dressing of contractile collodion, applied in the following manner. A piece of fine crêpe lisse (the best is sold under the trade name of silk illusion) should be cut in such a manner (Fig. 117) that it can be smoothly applied to the whole surface of the gland, and large enough to extend at least two inches beyond it in all directions, the nipple and areola being left uncovered. The crêpe lisse should be closely applied to the skin and fastened in place with a thin layer of the collodion. This should be allowed to dry, and the breast repainted at short intervals until the desired amount of compression has been attained. The illusion prevents any cracking of the collodion, which would otherwise result in the production of extremely painful fissures of the skin; but the dressing usually produces a circle of blisters around its edge, and is otherwise so uncomfortable, that it should be reserved for extremely threatening cases, in which its great efficiency makes it extremely valuable.

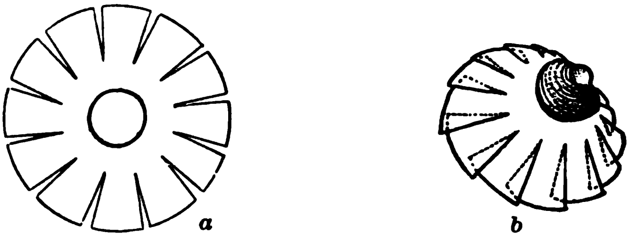

FIG. 117.—CRÊPE LISSE FOR CONTRACTILE DRESSING. *a*, Pattern; *b*, in position.

The contractile force of collodion when applied in this way in successive thin layers is so great that the breast can, if necessary, be reduced at once to the size of the non-secreting gland, and, if kept under such presssure for a period of from twelve to twenty-four hours, will almost invariably cease to secrete.

If this treatment, massage and compression, be intelligently applied at a sufficiently early period, and persistently carried out, failure to relieve a threatened abscess which begins by inspissation of the milk should be extremely rare. If such a gathering has been left untreated until the connective tissue around the ducts is inflamed, it can hardly be dissipated by pressure alone, and its treatment should be similar to that of those which originate by infection. The transition from the stage of inspissation to that of inflammation is of course marked by the appearance of increased pain and temperature, by extreme redness of the skin over the affected spot, and finally by fluctuation. This last sign is, however, often unobtainable in deep-seated abscesses of the breasts.

ABSCESSES WHICH ORIGINATE IN THE INTERSTITIAL TISSUE.—This form is decidedly less common than the preceding, and offers a much less certain prospect of averting suppuration. When this variety is thought to be present, an ice poultice should be placed over the affected spot, the pain quieted by opiates, the bowels freely opened by saline cathartics, the child removed from the breast, and the organ rendered immovable by a lightly applied bandage. If in spite of these measures the abscess progresses until it becomes probable that suppuration has already occurred, a hot poultice should be substituted for the ice, and the breast should be frequently examined to detect the first evidence of fluctuation. In case of doubt about the presence or absence of pus, it should be searched for with the needle of an aspirator, under antiseptic precautions. A medium-sized needle should be used, and ether must ordinarily be given.

When the presence of pus has been definitely ascertained, further delay can only result in an extensive destruction of the glandular tissue, and the only proper course to pursue is an immediate resort to the knife.

OPERATIVE TREATMENT OF MAMMARY ABSCESS.—The patient should be anæthetized, and the skin rendered thoroughly aseptic. An incision three-quarters of an inch deep should then be made through the skin and subcutaneous tissues only, its direction radiating from the nipple, *i.e.*, being parallel to the larger milk ducts. The site of the incision should be directly over the most dependent portion of the supposed collection of pus; a stiff probe or director should be forced through the tissues into the cavity of the abscess, and followed by a dilator or pair of scissors, and this should then be expanded to a degree sufficient to permit the entrance of the index finger, which should be made to explore every portion of the cavity, should break down all friable tissue, and lay bare all of the many connected chambers which are usually found (Fig. 118).

A sufficient number of openings should be made to afford free drainage to every part of the cavity, it being better to make several unnecessary openings than one too few; but on account of the danger of the formation of milk fistulæ if any important duct is divided, each of these openings should be made by the passage of a long probe or director, under the guidance of the finger, to the point at which an opening is desired. The probe should be made to pass through the tissues until its point is seen to dimple up the external skin, which should then be opened with a knife or scissors in a direction radiating from the nipple, and the sinus enlarged as before by dilatation. Drainage tubes of not less than one-fourth of an inch internal diameter should then be passed through the cavity from hole to hole; the whole breast should be thoroughly syringed out by an irrigation of not less than five minutes' duration, with a strong antiseptic solution, and an antiseptic dressing applied, under a moderately tight com-

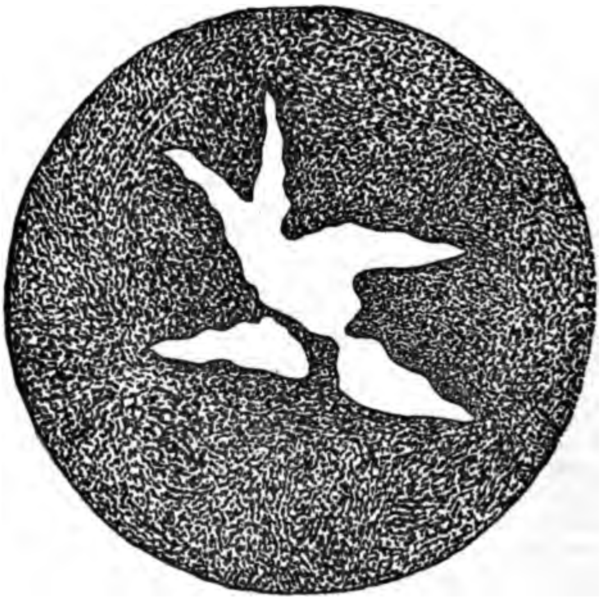

FIG. 118.—DIAGRAMMATIC SECTION OF A PARENCHYMATOUS ABSCESS OF THE BREAST.

pression bandage. The first dressing is usually promptly stained by the discharge of serum and the remains of the irrigating solution; it should, therefore, be removed at the end of from twelve to twenty-four hours. Its successor should be left *in situ* until the fifth day, when, if the discharge be slight, one or more of the tubes should be withdrawn, and shortened by at least one-half of their length, since nothing is more likely to produce obstinate fistulæ than an unnecessarily long retention of drainage tubes. In many cases it is possible to remove them wholly upon the ninth or tenth day; but the exact date of their ultimate removal must depend upon the progress of the individual case and the judgment of the physician. Full antiseptic precautions should invariably be observed throughout the whole operation.

ARREST OF LACTATION.

It may become necessary to dry up the breast, either at the time of weaning after prolonged nursing; immediately after delivery by reason of the death of the child, the constitutional condition of the mother, or her previous bad record as a wet-nurse; or during the first few weeks of the puerperium, for similar causes. After long lactation the glands are usually prepared by nature for the cessation of their activity, and the process of drying them up rarely causes trouble. It is then seldom necessary to adopt any other method than putting the baby on the bottle, and relieving the tension of the breast by stroking or by the use of the breast pump whenever they become tense; under which treatment the secretion usually ceases within a few days. Should a small amount of milk persist for a longer period, it may usually be arrested by the administration of atropia, if the constitutional condition of the mother offers no contra-indication to the use of this drug. The arrest of the milk when the breasts are at the height of their early activity is, however, a much more dangerous matter. If by reason of the death of the child in labor, or for some other condition, it has been decided beforehand that the mother is not to nurse, it is best to apply the pressure bandage, or, in threatening cases, even the contractile collodion, with the first signs of the appearance of the milk, trusting to the natural overflow under pressure to relieve engorgement, and emptying the breasts, if necessary, by careful massage, and the reapplication of the bandage. If the patient is strong and vigorous, the provocation of a moderate diarrhœa by saline catharsis may often be a useful adjuvant; but the use of atropia is seldom advisable, since the sensitive condition of the puerpera makes the constitutional action of the remedy distinctly undesirable. If the secretion is already established when the necessity for its arrest becomes apparent, the same method should be employed; but in such cases the frequent relief of over-distention by massage or the breast pump is usually necessary.

GALACTOCELE.—It occasionally happens that a milk duct may become permanently plugged, and result, by dilatation of the gland behind it, in the formation of a cystic tumor filled with milk, which may exceptionally attain an extreme size. The affection is chronic, belongs more properly to surgery than to obstetrics, and can be treated only by the knife.

MILK FISTULA.—When a lactiferous duct has been opened by a wound or by the extension of an abscess, a fistula results, which may continue to discharge pure milk, or milk more or less mixed with pus, for many months or years. It may sometimes be closed by persistent compression of the breast; occasionally by the inflammation excited by injections of tincture of iodine or a two-per-cent solution of nitrate of silver, repeated two or more times weekly with a small syringe; but may sometimes, on the other hand, be so intractable as to yield to nothing but the curette, or even require a dissection of its tract and the removal of the offending acini.

CHAPTER XXVII.

SEPTICÆMIA.

PUERPERAL fever is a term which has been used from time almost immemorial to designate the febrile affections of childbed, but in the light of modern knowledge it should be restricted to cases in which septicæmia is developed by the absorption of foul material through wounds due to parturition. In this sense the words puerperal fever will be used in this chapter.

It follows from the definition given above, that puerperal fever must always be due to the introduction of organic germs or their products into the blood of the patient. It is a matter of common knowledge that the usual source of such infection is through defective cleanliness of the hands or instruments of the accoucheur or nurse, one or the other of whom must always be held responsible for the causation of the disease; unless some probable source for an autogenetic origin can be found, for it must not be forgotten that, although such cases are extremely rare, they do undoubtedly exist.

The most common cause of an autogenetic sepsis is the persistence of a former attack of sepsis, under the guise of a chronic salpingitis, whose quiescent germs may be lighted into activity, if they are expressed by the force of labor from their seat in a partially encapsulated tube into the previously healthy cavities of the uterus or peritoneum. If these rare cases are excepted, obstetric septicæmia is a preventable disease; but though this statement is absolutely true in theory, it must not be forgotten that the attainment of absolute asepsis is a most difficult achievement, and that instances of infection do occasionally occur in the practice of the most careful men; so that it should be said that septicæmia may sometimes be the result of a failure to observe extraordinary precautions, rather than of the neglect of ordinary carefulness.

In estimating the importance of each case of puerperal fever, two factors must be considered—the amount of constitutional infection, or true septicæmia, which is present; and the severity of the local lesion, which is the source of that infection. The amount of constitutional impression is, to a considerable degree, independent of the extent and severity of its initial lesion. Local affections of the most alarming appearance may be accompanied by septic absorption which is only sufficient to cause a feeling of lassitude and depression, with but a slight decrease in any of the secretions, and a very moderate elevation of temperature. Cases of mild infection tend, as a rule, to spontaneous recovery after a variable number of days, but are by no means unimportant, since they often result in an undue prolongation of the convalescence, and in the production of chronic pelvic troubles.

Upon the other hand, local lesions of the most insignificant appearance are not infrequently followed by a severe and prolonged sepsis, which may end in recovery, or may terminate fatally either as the result of general exhaustion and a parenchymatous degeneration in all of the vital organs, or by the production of metastatic abscesses and distinct pyæmia.

The form of septicæmia to which Garrigues has given the title of acutest septicæmia is the result of the absorption of a poison of such extreme virulence, or in such overwhelming quantities, that death results from paralysis of the heart before a sufficient time has elapsed to permit the production of any visceral degeneration. Such an attack is fatal within two or three days, and is, fortunately, extremely rare.

The local affections which may occur are: decomposition of the lochia or of retained clots; so-called diphtheritic patches upon the vulva, vagina, or cervix; endocervicitis, and endometritis; purulent, diphtheritic, or gangrenous metritis, parametritis, salpingitis, or ovaritis; pelvic and general peritonitis; any of which affections may, if untreated, extend into the adjacent tissues, either by way of the lymphatics, or along the bloodvessels. The local lesion is always the source of infection, and its progress must be arrested before any constitutional improvement can be hoped for.

SYMPTOMATOLOGY AND DIAGNOSIS.—The first sign which usually awakens the suspicion of the attendant is an elevation of temperature; and though every elevation of temperature during the puerperal period is not due to sepsis, it should always arouse the physician to the use of every effort to account for its appearance. It may be due to a simple reaction after the exhaustion of labor; to constipation; to engorgement or threatened abscesses of the breasts; to acute nervous disturbances, such as puerperal mania; to sepsis; or to the onset of some intercurrent febrile disease of non-obstetric origin: so that the differential diagnosis must rest upon the presence of the other symptoms of obstetric sepsis, and the exclusion of all other possible causes.

The pyrexia of a simple reactionary fever appears within twenty-four hours of labor, while the onset of sepsis is rarely seen before the third day. Septicæmia is most likely to appear on the third, fourth, or fifth day, and the likelihood of sepsis decreases with the distance from that date.

A rise of temperature due to constipation is commonly gradual; that caused by the onset of the more common acute diseases, or by affections of the breasts, is more frequently sudden, and is often attended by a chill. The temperature of sepsis may appear in either form, but a sudden rise attended by a chill is common only in the most virulent forms, and is then accompanied by a well-marked group of other symptoms.

The other symptoms distinctive of obstetric septicæmia are diminution and foulness of the lochia, a decreased secretion of milk, and the appearance of abdominal and pelvic tenderness; but in the presence of a rise of temperature during the puerperium the physician, in addition to searching for these signs of sepsis, should inquire into the state of the bowels; should himself inspect the breasts; should examine the throat for tonsillitis, and the chest for pneumonia or pleurisy; and should use every effort to exclude the presence of any other general disease.

In doubtful cases or when any of the signs of septicæmia are present, he should never neglect to make a systematic examination of the genitals, both by sight and touch. The abdomen and breasts should be palpated; the pad should be inspected, and the presence or absence of a foul odor ascertained; the vulva should be exposed with a Sims' speculum,[1] and its whole surface carefully searched for the so-called diphtheritic patches, which, when found, present the appearance of a fine gray or grayish-white film, which is dotted about over the cervix and walls of the vagina wherever any abrasion or laceration has been produced during labor. Should nothing abnormal be found in the vagina, a small pledget of disinfected cotton should be introduced into the canal of the cervix, in order to detect any foulness of the cervical or uterine secretions, which are often markedly affected when the more copious vaginal secretions are but slightly stale.

If the result of this examination is negative, the uterus, tubes, ovaries, and broad ligaments should be carefully palpated bimanually, in order to detect any undue size of the uterus itself, such as might be caused by the presence of clots or portions of the placenta within the uterine cavity; to estimate the amount of tenderness over the uterus and other organs; and to ascertain the presence or absence of exudates in the adnexa.

TREATMENT.—Treatment should be divided into: first, measures directed to the support and stimulation of the system as a whole, in its warfare against the invading poison; and, secondly, those which are intended to prevent any further production of septicæmia, by the removal of its local source. Both are of the greatest importance, but, as the local lesions tend to extend and are, moreover, a constantly active source of fresh infection, it is impossible to exaggerate the value of early local treatment.

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[1] If well-marked symptoms of septicæmia are present, the probability of reopening a lacerated perinæum should not be allowed to interfere with a thorough examination of the vagina.

Local Treatment.—When the first signs of infection appear, the whole genital tract should be thoroughly explored, without an unnecessary hour of delay, under full antiseptic precautions, and if suspicious lesions are discovered, a vigorous attempt to disinfect the infected tract should be immediately made.

The vagina should be carefully cleaned, and so completely exposed that no single spot on its surface can escape the eye. If the surface of the cervix is clean and the cervical lochia are sweet, the uterine cavity should be left undisturbed; but if there is any suspicion of its invasion by the poison, the cleansing process should begin at the fundus.

The local applications which should be used vary with the form of the initial lesion in the individual case. Slight vaginal decomposition of retained clots or lochia, unattended by diphtheritic patches, may usually be relieved by bi-daily vaginal injections of a 1:3,000 corrosive sublimate solution. If the gray, so-called diphtheritic, patches are found, they should be dusted daily with iodoform, after the vagina has been cleansed by the corrosive douche; or in the more severe cases a 95% solution of carbolic acid should be applied to every portion of the diseased surface upon a bit of absorbent cotton, and followed by iodoform; or a strong solution of nitrate of silver (argent. nitrat. gr. lx.-aq. ℥ i.) may be used in place of the carbolic solution.

Endocervicitis and endometritis are to be recognized by foulness of the uterine discharge; they tend to spread rapidly by the lymphatics into the substance of the uterus, and thence to the peritoneum. Their complication by metritis and para- or perimetritis is to be known by the appearance of an abnormal amount of tenderness on bimanual palpation of the uterus. The milder grades may occasionally be promptly relieved by an intra-uterine douche, which is indicated whenever the cervical lochia are in the least foul; but most cases of septic endometritis are more thoroughly relieved by the gentle use of the dull wire curette.

Intra-uterine injections, though of great value in the treatment of such forms of sepsis, are by no means without danger. If their temperature is either too high or too low, they may be followed by alarming collapse; and if the return of the fluid is not carefully provided for, it may be forced through the tubes and be the cause of a general peritonitis, to say nothing of the danger of sudden death if air is forced into the uterus. Their use requires an accurate knowledge and observance of the proper technique.

If no other instrument is at hand, a carefully cleansed male silver catheter, which has been bent to the proper curve, may be made to answer the purpose, but when it is possible one of the specially devised instruments should be employed. The double current intra-uterine catheter devised by Bozeman (Fig. 119), and improved by Kelley is widely used, but for puerperal cases it has few advantages over less complicated instruments; and its device for insuring the prompt return of the injected fluid is less safe than that which is afforded by the patulous os characteristic of puerperal endometritis when held open by pressing the simple catheter or intra-uterine tube against its anterior wall (Fig. 120).

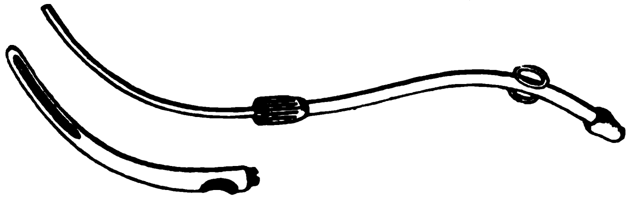

FIG. 119.—BOZEMAN'S DOUBLE CURRENT INTRA-UTERINE CATHETER.

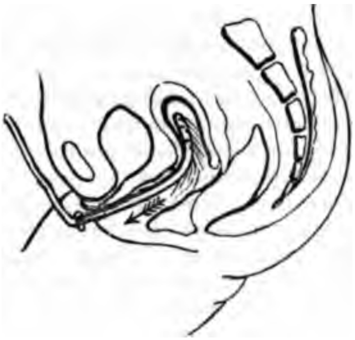

FIG. 120.—POSITION OF THE SIMPLE TUBE IN INTRA-UTERINE IRRIGATION.

Intra-uterine tubes of glass possess the advantage of cheapness, and their transparency renders the detection of any uncleanliness of their interior easy, but their rigidity renders them less convenient than those made of block tin, which can be bent to any curve that suits the shape of the individual uterus. The material is, however, of less importance than that the tube should be entirely closed at the end, and provided with several lateral apertures, which should preferably be directed backward, in order to promote the removal of the detritus from the uterine cavity.

The tube may be attached to any form of syringe, but, if a Davidson or other bulb instrument is used, the basin which contains the solution should be held above the vulva, to minimize the danger of the introduction of air, by the establishment of a siphon current. A fountain syringe, if obtainable, is distinctly to be preferred.

The solution should be a 1:4,000 corrosive, or 1:60 creolin, but if corrosive is employed its use should be followed by the injection of a small quantity of a 1:40 carbolic-acid solution, or of sterilized water, in order to avert the danger of mercurial poisoning, an accident which is especially apt to follow intra-uterine injections. The temperature of the solution should be not less than 105° F. nor more than 115° F., since the careless use of hotter water is not infrequently followed by sharp collapse, while a less temperature may be productive of a very uncomfortable chilliness.

Everything being in readiness for the injection, the patient should be placed in the lithotomy position, the cervix should be exposed by the largest speculum which can be introduced, and the vagina and cervix cleansed by pieces of absorbent cotton soaked in an antiseptic solution. The injection fluid should be allowed to run through the tube until the operator is satisfied that no air remains within the syringe, the tube should then be gently passed into the uterus, under the guidance of the finger, without interruption of the flow, and should be at once drawn forward toward the pubes in order to insure patency of the internal os for the return current. The tube should be gently moved from side to side, and the injection should be allowed to flow until the escaping fluid is not colored and is free from detritus; but throughout the operation the physician should constantly watch the returning fluid, in readiness to interrupt the current at the first sign of an incomplete return, because a patulous condition of the uterine orifices of the tubes is by no means infrequent, and the entrance of the injected fluid into the peritoneal cavity is by no means impossible, and greatly to be dreaded.

If the intra-uterine affection be limited to a mere inflammation of the mucous membranes, or to a decomposition of its normal secretions, the use of an intra-uterine douche may be sufficient to restore the parts to an approximately aseptic condition, and is then followed by prompt subsidence of the symptoms; but in the majority of cases it fails to remove the whole of the offending material; and since the exact condition of the interior of the uterus can rarely be accurately ascertained,[1] it is probably the best general rule to resort to a routine use of the dull wire curette in all cases in which the uterine lochia are distinctly foul—a rule which is justified by the fact that a careful use of this instrument is probably never productive of harm, while the positive results which almost invariably follow a thorough removal of the decomposed contents of the uterus would be abundantly sufficient to justify a much more dangerous procedure.[1] The use of the curette should always be preceded and followed by an intra-uterine douche. The best curette for post-partum use is the large placental curette introduced by Mundé (Fig. 121). It should be bent to a curve slightly greater than that of the uterus, with its sharper edge directed to the concavity of the curve; passed within the cavity under the guidance of the finger, and made to pass with a gentle oscillatory movement from side to side over the whole surface of the anterior wall of the uterus. It should then be withdrawn with a succession of scraping movements, and this process should be repeated until every portion of that wall yields the firm and almost grating sensation which is characteristic of uterine tissue. The curette should then be withdrawn; its shank should be bent to a curve somewhat less than that of the uterus, and with the sharper edge directed toward the convexity of the curve, and in this position should be made to explore every portion of the posterior wall in a similar manner. If necessary, it may then be so bent as to be adapted for similar scraping on each lateral wall.

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[1] When the os is sufficiently patulous to admit the finger, a digital examination will sometimes demonstrate the presence or absence of a sufficient quantity of adherent material to warrant the use of the curette.

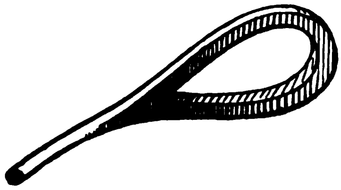

FIG. 121.—MUNDÉ'S PLACENTAL CURETTE, ACTUAL SIZE.

Metritis and the peri-uterine inflammations can only be reached by the removal of the endometritis which precedes and causes them, when nature usually effects their cure.

Salpingitis, ovaritis, and inflammations of the pelvic connective tissues are to be detected only by bimanual examination. They are beyond the reach of local applications, and should be treated by the application of poultices to the abdomen, by prolonged vaginal injections of boiled water (followed, if the physician prefers, by a smaller quantity of a corrosive sublimate solution), by absolute rest, and a moderate use of opiates. They may terminate in resolution, or in the formation of a pelvic abscess.

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[1] The theoretical objection that the curette makes a fresh wound, and is therefore likely to be followed by fresh infection, is to be answered by the fact that in practice this does not happen if antiseptic precautions are observed.

Daily bimanual examinations should be made with the utmost gentleness, and with scrupulous observance of antiseptic precautions. At the first appearance of undoubted fluctuation, an aspirating needle should be introduced, and if pus be found the needle should be used as a guide for the introduction of a director; a free incision should be made, the abscess cavity thoroughly washed out by a corrosive-sublimate injection, and a large drainage tube inserted. In most cases the danger of opening the peritoneal cavity is but slight, on account of the almost certain formation of extensive inflammatory adhesions before the time when fluctuation is apparent; and an early resort to the knife is preferable to a spontaneous opening, on account of the tendency of such abscesses to rapid extension.

Septic Peritonitis.—This affection may be treated by either of two diametrically opposite methods. The older and more established plan is the avoidance of cathartics, and a persistent use of opiates in degree sufficient to annul pain, however large the necessary dose may be; upon the other hand the followers of Mr. Tait forbid the use of opium, and seek to produce a copious, watery diarrhœa by the use of saline cathartics. This practice is founded on the idea that the peristalsis so induced causes a profuse exudation of thin serum into the peritoneal cavity, that the presence of a considerable amount of saline fluid in the intestinal canal results in the transference of that serum and its contained germs, by exosmosis, into the cavity of the intestines, and thus leads to their excretion through the anus. This method of treatment has been generally adopted among abdominal surgeons for the treatment of septic peritonitis after laparatomy, but is still vigorously opposed by some of the highest obstetric authorities;[1] and the choice between the two plans must depend upon the preference of the individual practitioner. I can only say that after a considerable experience with both methods I have given up the use of opium, and prefer to restrict myself in all cases to the administration of saline cathartics in frequently repeated doses; believing that the relief from pain is equally sure and much more prompt, that the duration of the disease is shortened, and the mortality greatly less than under the use of opiates.

If Epsom salts are retained by the stomach, they are to be preferred as the most certain, and the least likely to cause griping pain. Two drachms of the salt in a half-tumbler of water should be taken at once and followed by one drachm every two hours until the bowels move. In case the stomach at first refuses to tolerate the salts, an ounce of it may be dissolved in water and injected into the sigmoid flexure through a long rectal tube; or its use may be preceded by the administration of several Seidlitz powders at short intervals, or by one-tenth of a grain of powdered elaterin. The quantity of the cathartic should be sufficient to produce in twenty-four hours from ten to twenty watery dejections, according to the strength of the patient; alcohol and simple nutriment should be given freely, and from three to five dejections should be secured daily for several days after the subsidence of the symptoms.

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[1] Notably Garrigues.

Whichever plan is adopted may be combined with the application of poultices, turpentine stupes, or ice poultices to the abdomen for the relief of pain and tympanites.

Vomiting is often so troublesome and persistent a symptom that its treatment deserves a few words of special description. It should be combated by the administration of small quantities (one to two drachms) of black coffee, champagne, cracked ice moistened with brandy, soda water, hot water, matzoon, or koumyss. It disappears promptly so soon as the patient has taken enough salts to produce a free catharsis.

It has been lately urged that the chance of relieving a purulent peritonitis by abdominal incision, thorough cleansing of the cavity, and the establishment of free drainage, is such that no patient should be allowed to die of septic peritonitis unopened. The procedure is, however, by no means established, and is still *sub judice*. It is probable that the establishment of a general purulent peritonitis must always be attended by a degree of exhaustion which places the patient beyond the hope of relief by operation, but that, if the encystment of a purulent collection be suspected, laparatomy may be justifiable, so long as the patient is not already moribund. The operation is one which demands a peculiarly high degree of technical skill, and should never be attempted by an inexperienced operator.

Constitutional Treatment.—General constitutional treatment should be pursued in every case, and should consist in the enforcement of absolute rest, forced feeding, and the administration of alcohol. Perhaps the most important item of the three is the administration of simple and easily absorbed forms of food, in the largest quantity which can be retained by the patient's digestive system, even though its ingestion be at times against her desire. The food should be mainly albuminous, and preferably uncooked; milk mixed with soda or lime water in equal quantities or fermented in the form of koumyss or matzoon,[1] raw oysters, eggs swallowed whole in a little sherry, or stirred up with milk and whiskey in the form of egg-nogs, being usually the most useful. Alcohol, preferably in the form of whiskey, should be given from the start in doses which are sufficient to produce the least possible degree of exhilaration, whatever the quantity which this requires may be; though it must be remembered that any condition which can be called intoxication will but add the exhaustion of over-stimulation by alcohol to that which is due to the disease itself. It is often surprising to see what large quantities of alcohol such patients can ingest without visible effects, and the guide should be to administer it in sufficient quantities to preserve a normal fulness of the pulse, without producing any loquacity or dizziness.

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[1] These valuable preparations can be obtained from the leading apothecaries in most cities.

Extremely high temperatures may sometimes be treated to advantage by the use of antipyretics; but the depression produced by them usually more than counterbalances the relief obtained by the reduction of any ordinarily high temperatures. Quinine has been highly recommended, but is probably useful only from its somewhat problematical antipyretic action, and is not to be recommended.

Should the temperature remain persistently above 102.5° F., and be a source of discomfort to the patient, it may be greatly relieved by the use of the cold pack, or by sponging the whole body with cool water. The water employed for this purpose should be used at a temperature of about 65° F., or at first even higher, and may advantageously be mixed with a small quantity of alcohol. The sponging should include every portion of the patient's body; it should be continued until the temperature has fallen to 100° F., and should be repeated so soon as it returns to its former elevation. Sponging is upon the whole to be preferred to the more efficient, but also more exhausting, cold pack; which consists in enveloping the patient, after the removal of her clothing, in a sheet which has been wrung out of water at a temperature of 65° F. The bed is protected by rubber sheeting, and the wet sheet is remoistened with cool water at intervals of a few minutes, until the temperature has been reduced. The use of cold water in one or the other of these ways is often an expedient of great value, but should not be resorted to until it is evident that the discomforts due to high temperature are, in themselves, distinctly sapping the vitality of the patient.

The bowels should be kept loose and regular by the administration of mild cathartics, preferably salines. The bromides and sulphonal should be given sparingly whenever sleeplessness is a distinctly troublesome symptom, and opium should be used, in addition, in doses sufficient to control any excessive pain, unless it is contra-indicated by the adoption of the open-bowel treatment of peritonitis.

The mildest attacks of septicæmia are usually followed by subinvolution and often by the persistence of the inflammatory lesions in a chronic form. The physician should therefore make a careful bimanual examination of the pelvic organs within a few weeks of the recovery from any such attack, and, if diseased conditions are present, should institute the appropriate gynæcological treatment at once, since it is vastly more likely to be effective if applied early, than if it is deferred until the symptoms of the trouble force themselves upon the patient, at perhaps a much later period.

PHLEGMASIA ALBA DOLENS.—This affection is in reality an extensive phlebitis of the lower extremity. It may appear in either of two ways, as a primary phlegmasia starting from a thrombosis at the ankle, and spreading upward; or as secondary phlegmasia, due to extension of a thrombus from the pelvic veins into the thighs, and downward. The primary form may exceptionally follow a simple stasis in varicose veins; the secondary form is always the result of sepsis. It may appear at any time during the puerperium, but is rare in the first week. The affected part becomes swollen, tender, and painful; it pits on pressure. The skin is white and shiny; the temperature rises, though seldom to an extreme height; delirium of a mild type is an almost constant concomitant. The acute stage of the affection lasts from two to five weeks; the swelling, pain, and tenderness then gradually become less; but weakness, dragging pain, and lessened muscular power may be perceptible in the affected limb for many weeks, months, or even years. The prognosis is usually good, but is grave when the affection is secondary to well-marked sepsis, since it may then be followed by extensive suppuration, or even by necrosis, and is then productive of great and sometimes fatal exhaustion. The mildest cases may be followed by a detachment of a portion of the clot, and sudden death from embolism; this culmination is, however, rare in well-treated cases.

Treatment.—The affection demands both general and local treatment. The general treatment is that of any exhausting disease; *i.e.*, forced nourishment and a symptomatic use of opiates; stimulants should be avoided, since an increased activity of the circulation increases the danger of embolism. Locally the affected part should be warmly covered and kept absolutely still, all manipulation being dangerous and to be strictly avoided, in view of possible embolism. The affected limb should be wrapped in cotton batting covered with oiled silk, and immobilized by confining it within a folded pillow. The patient should be kept absolutely in bed, and the limb restrained from motion for at least a fortnight after the final disappearance of the swelling. After the disappearance of the acute stage of the affection, an elastic stocking or flannel bandage should be worn persistently so long as any disability in the limb is perceptible.

When the pelvic veins have been involved, it may be necessary to institute the gynæcological treatment appropriate to a varicosity of the broad ligaments, before relief of the chronic pelvic pain can be expected.

CHAPTER XXVIII.

THE INSANITY OF GESTATION.

The insanity of gestation differs from mental disease in general only in its cause, and may be present under the forms of mania or melancholia; either of which may alter, in the later stages of severe cases, into a state of dementia. It occurs upon an average about once in four hundred labors, but the percentages reported from different countries and different classes of practice vary widely. Women exhausted by long lactation, overwork, worry, or insufficient nourishment, and the illicitly pregnant present very much the largest percentages. It is comparatively rare among the better classes and in married women.

ETIOLOGY.—A large variety of theories have been adduced to explain the influence of the processes connected with child-bearing in generating insanity. Albuminuria is present in a certain proportion of cases, but its connection with the mental trouble is by no means established. An hereditary tendency toward mental disease is undoubtedly the primary cause in a large proportion of cases; and anæmia, also, frequently exercises a causative influence of some importance. Sudden bereavements, grief, anxiety, the shame of illicit pregnancy, and obstetric sepsis are the common secondary causes.

Moral Impressions.—The mental changes which attend the progress of most normal pregnancies are well known and generally recognized. Alterations of manner and temper, whims and caprices, and unusual tastes or desires occur with the greatest frequency, and are attended by a certain decrease in the stability of the mind and nervous system. If, then, this psychic condition occurs in a person whose inheritance already predisposes her to insanity, and is accompanied by extreme anæmia, the fatigues of a painful or delayed labor, or the exhaustion of sepsis, it is by no means surprising that mental disease should follow. Excessive brooding over the terrors of an approaching labor was thought by Fordyce Barker to predispose strongly to insanity among primiparæ, his views being founded on the fact that he had seen thirteen such cases in the wives of physicians, who had probably been injudicious enough to examine their husbands' obstetric libraries.

Anæmia.—Anæmia is present in a marked degree in a large proportion of all cases of the insanity of pregnancy or the puerperium, and the comparatively favorable prognosis of these cases, as contrasted with other forms of mental diseases, has been attributed by many to the possibility of removing by treatment this important element in its causation. The exhaustion and impoverished state of the blood which follow prolonged lactation are thought to bear a similar relation to the insanity which sometimes appears at that period.

Septicæmia.—Mild sepsis has been of late years generally accepted as a frequent though not constant element in the mental diseases of the puerperium; but in this connection it is important to remember that some cases of septicæmia are attended by early and pronounced delirium, which, unless care be taken, may lead to an erroneous diagnosis of insanity. In practice, the distinction is to be made, largely, by the comparatively short duration of a mere delirium, and its prompt relief by radical antiseptic treatment.

CLASSIFICATION.—The class of mental diseases under discussion, is usually divided into the insanity of pregnancy, parturition, the puerperium, and lactation.

Insanity of Pregnancy.—At this period the most common form of mental diseases is a mild melancholia, most of the attacks being to a certain amount intermittent and susceptible of comparatively easy management. Delusions are rather uncommon. The patient is depressed and apprehensive, the ordinary affairs of life cease to interest her, she is often apathetic and careless, and her family affections frequently become obscured or are replaced by an unnatural aversion. This form of insanity usually disappears immediately after parturition, seldom necessitates removal to an asylum, and is comparatively infrequently attended by inclinations to suicide or violence.

Insanity of Parturition.—That distinct, though transitory, insanity may occur during the later stages of labor has been generally admitted. The trouble, however, rarely surpasses a temporary but almost maniacal excitement, which is due to the intense pain, and is comparatively seldom seen since the introduction of anæsthesia. It is commonly attended by a desire to injure or destroy the child which, when once present, may endure for some minutes or even hours after delivery.

Insanity of the Puerperium.—This usually appears during the first few weeks of convalescence, and generally assumes the form of mania: it may follow a marked degree of the psychosis of pregnancy, or may appear suddenly and quite unheralded. It is usually preceded by a temporary state of depression or irritability, and not infrequently by a vague apprehension of trouble soon to come. Attempted violence to the bystanders or to the child is not infrequently the first sign of insanity noticed. The patient is noisy, excited, and incoherent; the memory is impaired, and the mind wholly disordered. The mental tone may be that of good humor, or of irrational rage, during which the patient may exhibit a physical strength and endurance quite foreign to her ordinary habits or abilities.

Delusions of dread or suspicion are by no means uncommon, and are especially likely to be directed toward the patient's nearest and dearest friends and relatives. A not uncommon and most distressing symptom is the use of the most foul and obscene language, and a tendency to give the most public expression possible to the most disgusting ideas—a phenomenon which has been considered by many to be related to the origin of the trouble in a function of the genital organs. Insomnia is almost constant; the digestion and other vital functions are invariably impaired; and a somewhat elevated temperature may be present, more especially in the afternoon, even though sepsis is absent; but any pyrexia should always excite suspicion, and should occasion a careful search for a possible septic complication.

Insanity of Lactation.—This usually appears at the end of prolonged nursing, and in patients who have become distinctly exhausted and anæmic, the most common form being that of melancholia.

PROGNOSIS.—The prognosis in these affections is greatly obscured by the fact that the reported statistics vary very widely, but it is probable that under approved methods of management about 60% of all cases recover; mania being the more fatal to life, while melancholia is more often followed by prolonged or permanent loss of reason.

TREATMENT.—The first and perhaps most important question in the management of these affections is whether the patient shall be at once transferred to an asylum or allowed to remain in her home. There can be no question of the fact that the equipments and surroundings of an institution devoted to the purpose offer the patient a decidedly greater chance of recovery; but the prejudice against commitment is so great, and the stigma which attaches to it is so lasting, that in the majority of cases the consent of the friends is refused so long as a reasonably hopeful prognosis can be given; yet the physician is unwise in assuming the management of such a case outside the walls of an asylum, unless the circumstances of the patient are such as to permit the constant care of at least two trained assistants; since it is absolutely necessary that she should be watched without intermission, day and night, so long as any degree of alienation exists, and because a person who is unused to the care of the insane is almost certain to be duped by their cunning.

If the experiment is undertaken, every effort should be made to assimilate the conditions of the patient's surroundings to those which would be afforded by an institution, and especially in the direction of absolute isolation from noise, excitement, and the visits of friends: no person whatsoever should be allowed to enter the patient's room except the professional attendants, and every effort should be made to suppress the usual noises of the household.

The next point of importance is a careful estimation of the causative elements which are most prominent in the individual case. Should the slightest degree of sepsis be present, no effort should be spared to eradicate its nidus in the most prompt manner possible, and to combat the exhaustion which it produces by immediate and forced feeding. If the attack has been preceded by a condition of anæmia, much can be hoped from the administration of ferruginous tonics; which are, however, frequently ineffective unless combined with arsenic.

In all cases the condition of the bowels must be carefully attended to. Fresh air and sunlight and, so far as possible, cheerful surroundings are of the utmost importance. The use of hypnotics is a matter which calls for the exercise of great caution and much judgment. Paroxysms of maniacal excitement may sometimes be controlled by hypodermic injections of morphia in full doses, or by $\frac{1}{100}$ of a grain of hydrobromate of hyoscine similarly administered. The bromides in dose of from 30 to 40 grains, and paraldehyde in from one to two drachms, are sometimes valuable, but should not be used indiscriminately; in the sleeplessness of melancholia, occasional doses of sulphonal are sometimes efficacious.

In the insanity of pregnancy the question of the propriety of inducing labor may occasionally arise, but should never be resorted to unless the mental alienation has already reached an exaggerated and dangerous type, since the manipulations necessary to its performance are not infrequently sufficient to determine the appearance of such a form.

When delirium, or any mental trouble or excitement, appears during labor, it is always the duty of the physician to administer an anæsthetic and deliver at once, when the birth of the child is almost invariably followed by the disappearance of the trouble.

PREGNANCY OF THE INSANE.—It was formerly thought that women already insane might be favorably affected by the influences of pregnancy and parturition; but modern observations furnish so little support for this theory that it has been wholly abandoned, and the permission of pregnancy to the insane must now be considered as wholly unjustifiable, if only on sociological grounds.

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